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Design of Engineered Ribosomes for Synthetic Biology

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Abstract

Design of Engineered Ribosomes for Synthetic Biology

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The *Escherichia coli* ribosome is a molecular machine capable of sequence-defined polymerization of α-amino acids into proteins, a feat unmatched by any other current synthetic catalyst. It is complex in its structure, comprised of 3 RNA parts (the 5S, 16S, and 23S ribosomal RNAs) and 54 ribosomal proteins (r-proteins). Efforts in synthetic biology have focused heavily on engineering the ribosome, and more broadly, the translation apparatus for designer functions, and ample progress has been made in the field of ribosome engineering. However, ribosome engineering is still limited by a lack of methods to engineering large RNA machines as well as efforts to "escape" the evolutionary valley of the ribosome's fitness landscape. In this work, we present advances made to address these limitations, with particular focus on applying principles rooted in design of molecular machines to the ribosome.

The key idea is to free the ribosome from the constraints of its natural function, the synthesis of the cellular proteome. Towards this, the development of the tethered ribosome (termed Ribo-T), in which the small and large subunit rRNAs (16S & 23S) are covalently linked, has been groundbreaking, but is limited by its relatively diminished function compared to a bipartite ribosome. Improvements to Ribo-T function would accelerate ongoing and future efforts to evolve Ribo-T's catalytic active site and related motifs towards new chemistries beyond peptide bond formation

between two α-amino acids, opening up the field for the synthesis of new materials and medicines. In this work, I describe the development of Ribo-T v3, which is over 50% improved in orthogonal GFP production and over 96% improved in upkeeping cellular life compared to the previous state-of-the-art. To achieve this, I invented a method termed Evolink, which allows for high throughput directed evolution of multiple coding regions of a molecular machine that may be far apart in primary sequence, but proximal in 3D space and likely interacting.

Another way to imagine escaping the 'evolutionary valley' of the wild type ribosome sequence is to change the sequence and architecture of the ribosome. I present in this work our efforts to minimize the bacterial ribosome *in vitro*, which maps permissible regions for deletion. Further, I demonstrate the use of *de novo* 3D RNA structure prediction algorithms to rescue rRNA deletions that at first glance appear to be fatal to ribosome function. Minimized ribosomes allow the engineer a different starting point for directed evolution as well as reducing the size and complexity of the ribosome. From this work, we hope to one day distill structure-function rules in the bacterial ribosome, leading to elucidations in fundamental ribosome assembly as well as ribosome function.

Taken together, I hope that the work presented in this dissertation will enable further acceleration of efforts in ribosome engineering and genetic code expansion to bring forth new classes of sequence-defined polymers with far-reaching applications in medicine, energy, and materials.

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Dedication

To my beloved Eleanor.

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Introduction

The Escherichia coli ribosome and its context in protein translation

Protein translation occurs through a consortium of molecular machines that enable sequence-defined polymerization of α-amino acids into proteins, also referred to as polypeptides. In bacteria, protein translation occurs at high rates (up to 20 amino acids/second)[1] and with excellent sequence fidelity (99.99%)[2]. This process is achieved through a collaborative effort involving many simultaneously acting molecular machines, and thus it is important to view the ribosome not in isolation but within the symphony of associated helper proteins and factors involved in protein translation. Therefore, I will first describe the process of translation in bacteria, highlighting the molecular machines required to achieve sequence-defined polymerization (**Fig. 1**). Although I will focus on engineering ribosomes in this work, it should be noted that the engineered translation apparatus for new chemistries will most likely require tuning of most, if not all, of the machines mentioned in the following text.

The key processes of translation we discuss include both monomer synthesis and polymerization. Specifically, monomer synthesis includes the generation of aminoacyl-tRNA monomers by aminoacyl-tRNA synthetases (aaRSs), which link together amino acid monomers and transfer RNA (tRNA) adapter molecules for decoding messenger RNA (mRNA) templates. In the polymerization stage of translation, aminoacyl-tRNAs are delivered to the ribosome by elongation factors, and the monomers are utilized in a polymerization reaction by the ribosome, which produces sequence-defined polypeptides (**Fig. 1**).

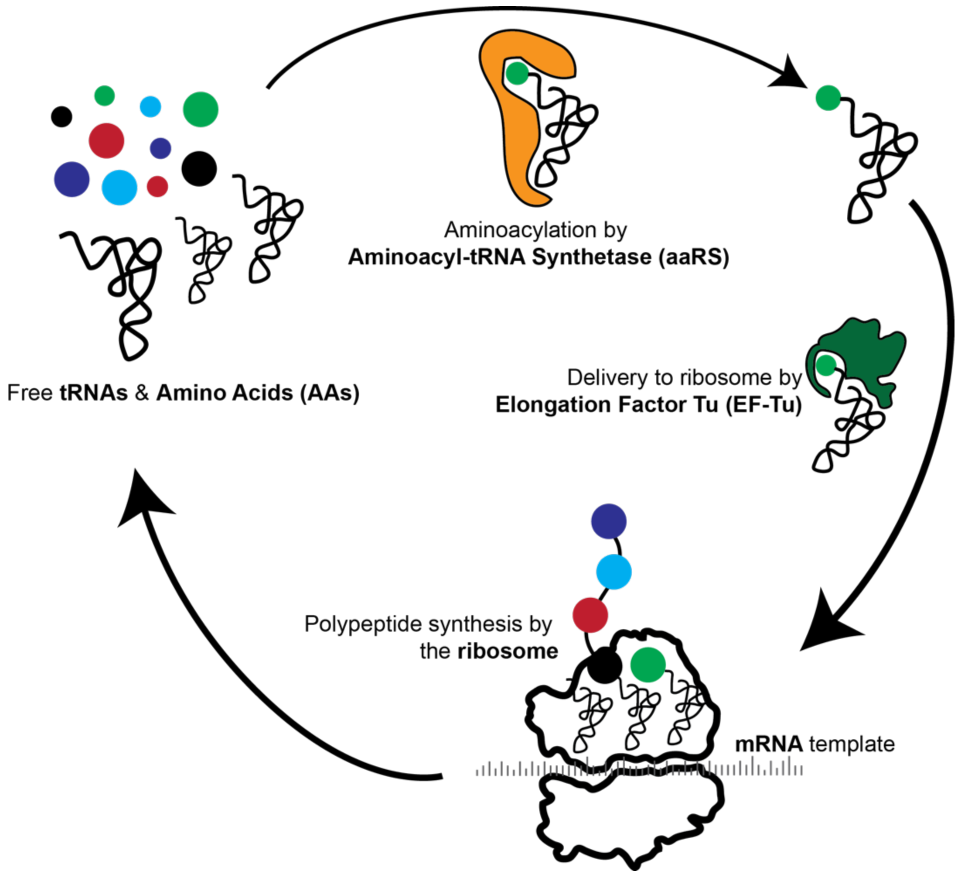

Figure 1. **An overview of protein translation.** Free tRNAs and amino acids (top left) are coupled together by aaRSs (orange) to generate an aminoacyl-tRNA monomer (top right). The monomer is then delivered by EF-Tu (green) to the ribosome, where polypeptide synthesis is catalyzed, and free tRNAs are recycled to be charged again with amino acids.

In translation, amino acid monomers must be linked to tRNAs for polymerization. The suite of aaRSs, which acylate free amino acids onto specific tRNAs, has been evolved extensively to ensure that the proper amino acid is acylated onto the 3' end of the corresponding tRNA. Proper acylation of tRNAs with the corresponding monomer is critical to maintaining high sequence fidelity. The generation of new aminoacyl-tRNA molecules represents a key opportunity to expand the chemistry available to the translation machinery.

In bacteria, the interaction between the ribosome's anti-Shine-Dalgarno (aSD) and the Shine-Dalgarno (SD) sequence in mRNA drives translation initiation.[3]. The SD-aSD interaction is primarily bacterial and archael, although similar versions of it exist like the Kozak sequence in eukaryotes[4]. After binding, the ribosome begins to move 5' to 3' along the mRNA. Aminoacylated-tRNAs are delivered to the ribosome by elongation factor Tu (EF-Tu) as mRNA reading progresses, and the aminoacyl-tRNA with the anticodon corresponding to the mRNA codon is accommodated in the ribosome's A-site. This specific pairing between the mRNA codon and tRNA anticodon forms the foundation for sequence-defined polymerization.

In a way, the ribosome is the most central molecular machine in protein translation. It is the meeting place of all translation components: aminoacyl-tRNAs, EF-Tu, mRNA, and the resulting protein product. The orchestration and coordination of these substrates at the ribosome's sites for interaction allows for an unparalleled sequence fidelity and speed of protein translation. Thus, the ribosome presents a compelling target for engineering for sequence-defined polymerization reactions, as an appropriately engineered ribosome tuned to designer chemistries and substrates would facilitate rapid prototyping of many different types of polymers, including polyketides and other natural products.

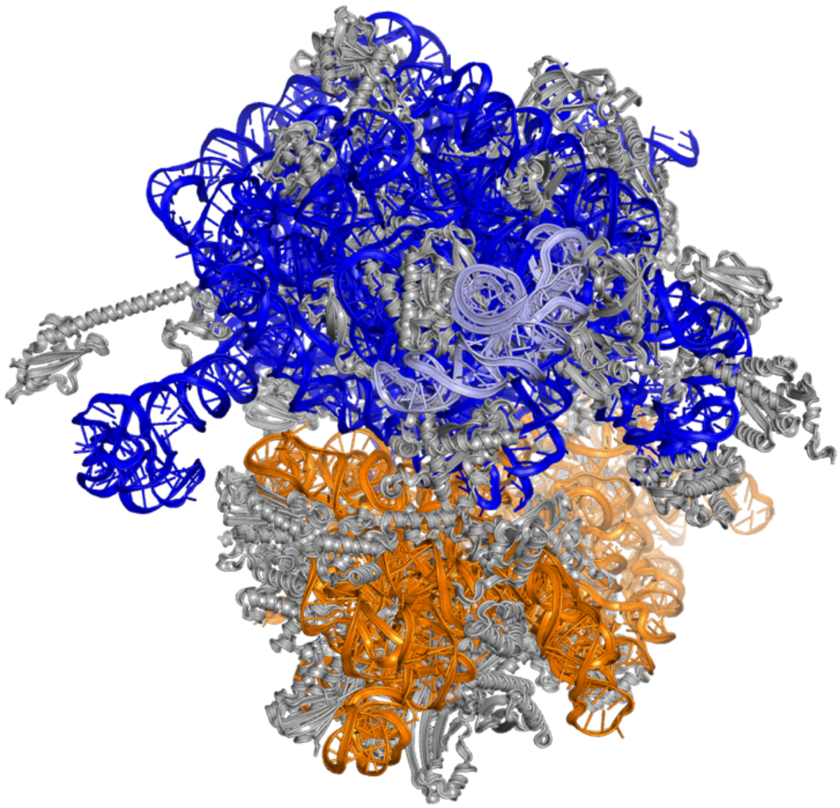

Figure 2. Structure of the E. coli ribosome (PDB ID: 4YBB). The 23S rRNA (blue), 5S rRNA (light blue), and 33 ribosomal proteins (gray) make up the 50S large subunit. The 16S rRNA (orange) and 21 ribosomal proteins (gray) make up the 30S small subunit.

The *Escherichia coli* ribosome is a ribonucleoprotein machine, made of three ribosomal RNA (rRNA) molecules: the 5S, 16S, and 23S rRNAs, and 54 ribosomal proteins (r-proteins)(**Fig. 2**)[5]. The 16S rRNA and 21 r-proteins comprise the 30S small subunit, while the 5S rRNA, 23S rRNA, and 33 r-proteins make up the 50S large subunit. The 30S subunit is primarily responsible for mRNA decoding, while the 50S subunit is responsible for the catalytic activity of the ribosome. tRNAs carrying amino acid monomers move through the ribosome in a linear fashion, from the A-site to the P-site to the E-site. The A-site of the ribosome accommodates incoming tRNAs and enables correct pairing between the mRNA codon and tRNA anticodon. If the codon-anticodon pairs do not match, the tRNA is rejected and another is sampled until the correct tRNA is stabilized in the A-site. In the case of formylmethionine (fMet)-tRNA, which is recognized as the first aminoacyl-tRNA of a polypeptide chain, the tRNA is translocated to the P-site, since the primary amine does not participate in peptide bond formation. For all other tRNAs, the ribosome catalyzes peptide bond formation between the ester of the nascent peptide chain bound to the 3' CCA end of the P-site tRNA and the primary amine of the incoming aminoacyl-tRNA in the A-site. The region of the ribosome responsible for catalyzing peptide bond formation is called the peptidyl transferase center (PTC). Remarkably, the atomic structure of the ribosome revealed the hypothesized catalytic residues of the PTC to be made primarily of rRNA, establishing the ribosome as a ribozyme[6].

The current hypothesis, based on structural insights and careful biochemistry experiments, is that the ribosome's PTC works by carefully positioning key water molecules around the peptidyl-tRNA and aminoacyl-tRNA in the P-site and A-site, respectively[7]. The leading hypothesis for the ribosome's mechanism of action is that the ribosome operates as an entropy trap[8]. Before peptide bond formation, the ribosome, A-site, and P-site tRNAs are separate bodies. The ribosome's PTC then coordinates key water molecules to form an intermediate that connects all three bodies, thereby lowering the local entropy. This lowering of entropy drives peptidyl transfer, producing the peptidyl-tRNA in the P-site, and empty tRNA in the E-site and the surrounding ribosomal rRNA residues as separate bodies. Peptidyl transfer, therefore, nets positive entropy, going from one reaction intermediate to three separate bodies. This mechanism of action is distinct from that of most other catalytic enzymes, such as the aminoacyl-tRNA synthetase, which works through more clearly defined catalytic residues. Recent works by Polikanov and colleagues resolved this mechanism further, through the establishment of the “proton wire”. [7] To expand the ribosome's palette of substrates towards natural product synthesis, we suspect that it will be important to keep in mind the ribosome's unique mechanism of action.

After the formation of a new peptide bond, with the nascent peptide chain is covalently bound to the A-site tRNA, the ribosome moves along the mRNA in a ratchet-like motion, and the P-site and A-site tRNAs are translocated to the E-site and P-site, respectively. The translocation of tRNAs happens in conjunction with the movement along the mRNA, which opens up the next codon for matching with the A-site tRNA, and this process of elongation continues until a stop codon (UAG, UGA, or UAA) is reached in the mRNA message and a release factor releases the nascent polypeptide from the P-site tRNA. Another feature of note is the exit tunnel, a channel formed by both rRNA and r-proteins through which the synthesized polypeptide chain is excreted[9].

Engineered ribosomes for synthetic biology

The promise of engineered ribosomes

With the understanding of the ribosome's intricate mechanism of action, harnessing the ribosome to manufacture peptides with alternative chemistries (i.e., polymerization of monomers outside of the 20 canonical amino acids) has been of great interest. In particular, monomers with different backbones than α-amino acids have garnered special attention from the field of ribosome engineering. The ability to incorporate such expanded-backbone monomers (*e.g.,* β- and D-amino acids) would be vital in utilizing the cell's translation machinery as a prototyping and production platform for new medicines and materials. A particular advantage is the translation machinery's ability to produce a vast number of different sequence polymers from even a limited set of monomers, much like the incredible diversity of proteins made from just 20 amino acids as seen in nature. From an engineering perspective, once the fundamental breakthrough of allowing alternative chemistries to occur is solved, a wealth of possibilities can be accessed by simply changing the mRNA templates. Previous works suggest this is possible, and in the following sections, we will describe those advancements.

There is much evidence that an engineered ribosome will be key for the production of the next generation of polymers and macromolecules, such as natural products with therapeutic potential (**Fig. 3**). Several works point to the wild type ribosome as a significant limitation in processing β- and D-amino acids as a substrate for polymerization [10-12]. An engineered ribosome would not only unlock the process of directly synthesizing complex noncanonical polymer products, but also enable many selection strategies that aim to engineer the surrounding translation machinery (aminoacyl-tRNA synthetases, elongation factors, and tRNAs) to more efficiently accept monomers beyond α-amino acids. Many selection schemes for enzyme engineering rely on successful translation of a target protein, and thus rely on a ribosome to carry out polymerization. Already, previous pioneering works by Hecht as well as Schepartz and Söll have shown that the peptidyl transferase center, through random mutagenesis and selection, can be directed towards improved incorporation of β- and D-amino acids[13-19].

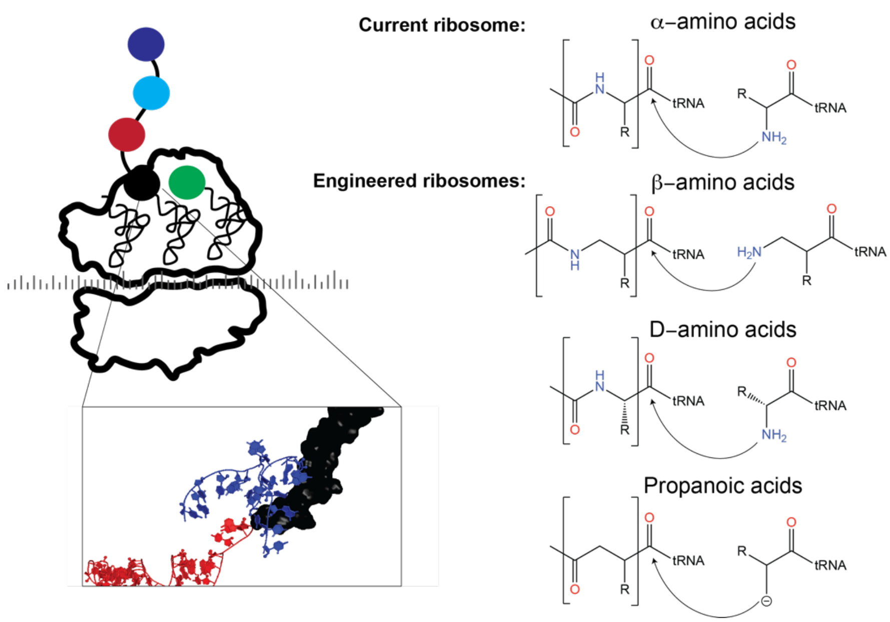

Figure 3. Ribosome engineering for alternative chemistries. Residues 2057-2063 and 2496-2507 (blue) of the 23S rRNA have been mutated to allow incorporation of beta- and D-amino acids into polypeptide chains. The P-site tRNA (red) and the nascent peptide chain (black) are shown for reference. Polymerization reactions of β-amino acids, D-amino acids, and propanoic acids (right) are provided as examples of chemistries that would be transformative for polymer synthesis.

For example, the Hecht group leveraged puromycin-based selection of β- and D-amino acid permitting ribosomes, taking advantage of puromycin as an aminoacyl-tRNA mimic in the active site of the ribosome[13-18] (**Fig. 3**). By generating a mutant population of ribosomes with bases 2057-2063 and 2496-2507 or 2582-2588 (standard *E. coli* 23S rRNA numbering) randomized using standard molecular biology techniques, and leveraging their puromycin-based selection system, mutant ribosomes with an enhanced ability for incorporating β- and D-amino acids were identified in an *in vitro* translation system. For this work, the Hecht group utilized pdCpA-based methods to charge the modified amino acids onto tRNAs. To generate the mutant ribosomes, the Hecht group used expressed mutant ribosomes from a plasmid template alongside the cell's native wild type ribosomes, then using S30 crude cell lysates, captured and identified mutant PTC sequences that enable enhanced incorporation of β- and D-amino acids. Interestingly, sequences allowing β-amino acid incorporation were different from sequences allowing D-amino acid incorporation, giving support to the notion that there may not be one engineered ribosome that can allow for all modified backbones, but somewhat different solutions to different monomers. This is an important realization, and congruent with the notion that the wild type ribosome evolved to be specific to a single type of monomer, and thus is evolutionarily constrained in both sequence and architecture for this specific polymerization chemistry. One possible limitation of the method pioneered by the Hecht group is that the mutant ribosomes are generated inside of cells, and thus ribosomes that may be capable of the desired chemistry but disturb cellular functions would be eliminated. Such ribosomes that are deleterious to cellular function are termed dominant lethal, meaning that expression of such ribosomes, even in minute quantities, is deadly to a cell. Nonetheless, this body of work is profound, because it provides, for the first time, evidence that the ribosome can be engineered for enhanced incorporation of altered backbone amino acids that are commonly found in peptide-based natural products.

Building upon the work from the Hecht group, recent work by the Schepartz and Söll groups has shown the ability to produce a β-amino acid containing protein *in vivo*. Specifically, they found a variant ribosome named P7A7, which contains diversity at positions 2496-2507 and builds upon a previously identified ribosome mutant by the Hecht group called 040329 containing changes in 13 positions between 2057 and 2507[19]. The P7A7 ribosome diverges from the wild type ribosome sequence at 12 positions in the 23S rRNA. In addition to identifying the P7A7 ribosome variant that can successfully synthesize dihydrofolate reductase containing a single β-amino acid (β^3-(*p*-Br)-Phe), their work also tested the compatibility of other translation machinery, namely elongation factor Tu, with backbone modified amino acids. A key innovation in this work is that the β-amino acid incorporation by the ribosome was carried out *in vivo*. Their work supports the notion that, given the necessary translation machinery, incorporation of backbone-modified monomers by the ribosome is possible in living cells. Because the work was carried out *in vivo*, the group relied on a promiscuous aminoacyl-tRNA synthetase, the phenylalanyl-tRNA synthetase, to charge the respective tRNA with the β-amino acid. As the field seeks to expand upon this work, we can expect a greater focus on backbone-modified amino acids, which will be crucial in serving as templates for peptide-based natural products. Remaining challenges include the development of engineered orthogonal translation systems with higher efficiencies towards backbone-modified monomers, including aminoacyl-tRNA synthetases, tRNAs, and elongation factors that can enable the robust synthesis of new polymers and macromolecules.

Aside from targeted engineering of the ribosome's active site, efforts to engineer the ribosome's ability to expand the genetic code beyond the 20 canonical amino acids have also been successful. Namely, Chin and colleagues have shown that engineering the ribosome's small subunit can lead to expanded functions for message decoding, specifically the ability to better decode the UAG amber stop codon [20] (by tuning interactions with Release Factor 1) and improving decoding of quadruplet codons [21] (by optimizing interactions with tRNAs). Such efforts may contribute meaningfully to expanding the translation apparatus's capacity towards natural product synthesis, since the current state of the genetic code divides the 61 possible codons amongst 20 amino acids and expansion of this message-decoding dogma will be necessary for new monomers.

Many previous works engineer new functions into the translation machinery, which range from tuning the ribosome's catalytic to expanding message reading activities towards new coding schemes. These works provide much support for exciting developments in the near future. Complementary to such successes are meaningful advancements in platforms for ribosome engineering, which have enabled many of the works described thus far, and in some cases, have been born out of the successes in translation machinery engineering. In the following section, we describe promising platforms that enable robust ribosome engineering.

There exists a growing body of work more broadly enabling the field of ribosome repurposing. Here, I highlight select advances that are particularly applicable to ribosome engineering and offer perspective on why these developments, in particular, may be transformative for engineering the ribosome towards new functions.

Platforms for ribosome engineering *in vivo*

Engineering the ribosome *in vivo* has key advantages, such as cost to scale, decreased sensitivity to RNases, and accessibility to many evolution strategies that take advantage of life/death selections. For *in vivo* engineering, the ability to freely and precisely engineer the ribosome in the presence of other cellular ribosomes without the constraints of cell viability is important. The development of orthogonal ribosomes to address this need has been exciting[22, 23]. For example, the development of the improved amber codon decoding and quadruplet decoding ribosomes were built upon recent advancements in orthogonal ribosomes[20-22]. Orthogonal ribosomes are directed towards translating specific mRNAs and have significantly decreased abilities to read wild type mRNAs that encode for the cellular proteome. This is achieved by altering the anti-Shine Dalgarno (aSD) sequence of the small ribosomal subunit in conjunction with the mRNA's Shine-Dalgarno (SD) sequence to establish orthogonal message reading[22, 23]. This makes possible a system in which the cellular ribosomes perform their native function (synthesizing the proteome) while engineered orthogonal ribosomes with custom functions can be directed solely towards targeted mRNA molecules that encode a polymer of choice, such as a peptide-based natural product (**Fig. 4A**). One historical limitation of this approach is that although the small subunit, responsible for message reading, can be made orthogonal, the large subunit, mainly responsible for peptide bond formation (PTC) and product excretion (exit tunnel), is freely able to associate with both wild type and orthogonal small subunits given the bipartite nature of the ribosome[24]. Thus, it remained difficult to engineer the ribosome for alternative chemistries without disrupting cellular functions. The development of a tethered (also referred to as stapled) ribosome addressed this limitation through covalent linking of the 16S rRNA of the small subunit with the 23S rRNA of the large subunit [24, 25] (**Fig. 4B**). Now, both the small and large subunits of the ribosome can be made orthogonal, and thus specialized populations of both ribosomal subunits can be directed towards custom message reading as well as engineered chemistries. In addition, this system can be flipped, freeing up the bipartite ribosome for engineering.[26] In both the tethered ribosome and stapled ribosome, the large subunit was altered in the orthogonal context to showcase the ability of the ribosome's 23S rRNA to be altered without impacting cell viability. For example, the tethered ribosome, called Ribo-T[27], was mutated in the PTC to demonstrate the ability synthesize protein sequences that the natural ribosome does not translate[24]. More recently, it was also shown that the stapled ribosome could be engineered at residues proximal to the P-site tRNA and exit tunnel (2063, 2447, 2450-2452, 2506, 2583-2585, and 2602) to permit the incorporation of multiple consecutive prolines[28].

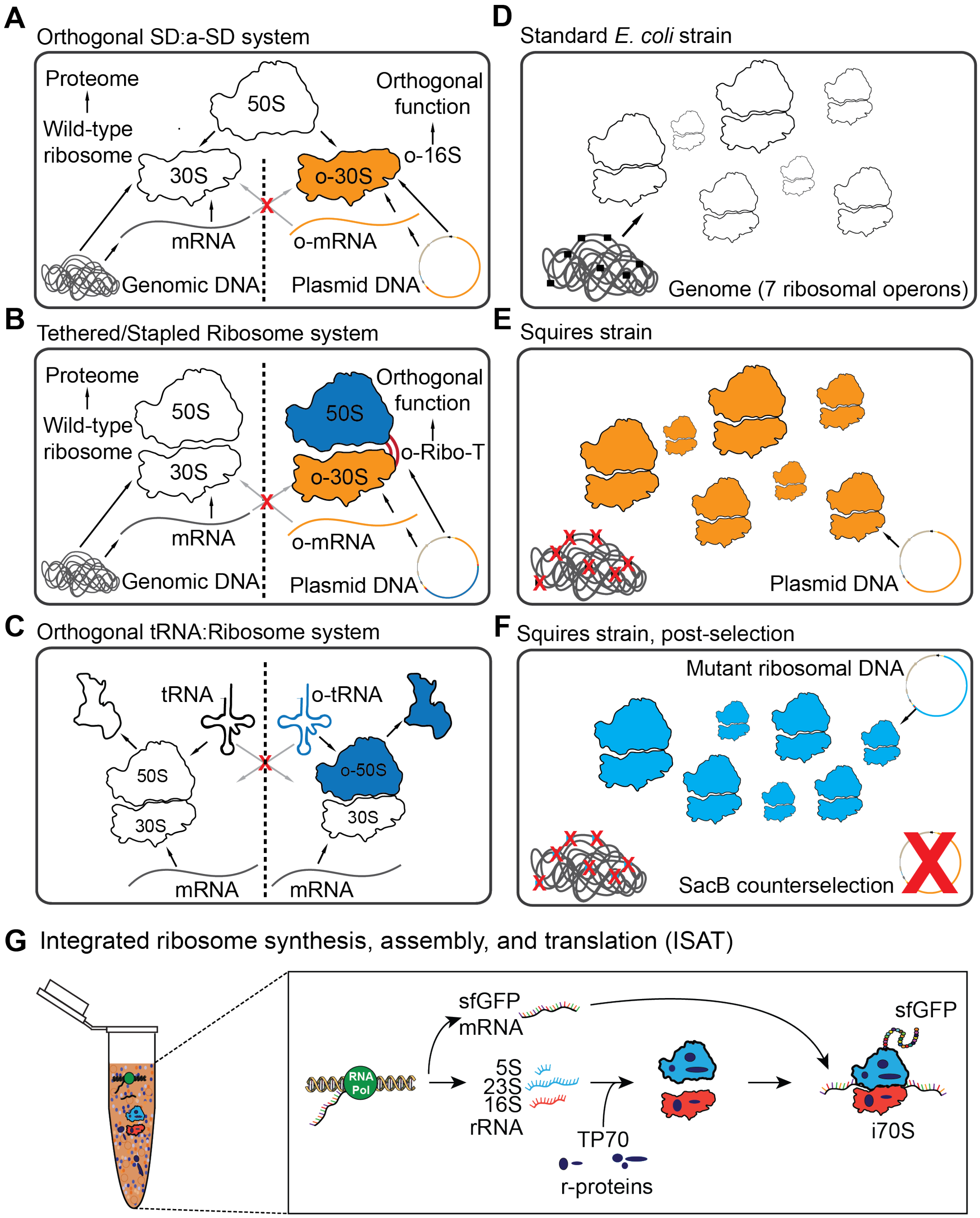

Figure 4. Platforms for ribosome engineering. (A) Orthogonal pairs of Shine-Dalgarno: Anti-Shine-Dalgarno in o-mRNA and o-30S subunits, respectively, allows specialized mRNA reading. (B) Tethered or stapled ribosomes covalently link a 50S subunit to the 30S subunit, enabling a dedicated 50S subunit for engineering and specialized protein production. (C) Ribosomes can also be made orthogonal to special populations of tRNA by engineering the rRNA:tRNA interface. (D-F) SQ171, also referred to as the Squires strain, encodes ribosomal RNA exclusively from a plasmid, and allows testing of mutant ribosomes for their ability to upkeep cellular life after selection. (G) Integrated

ribosome synthesis, assembly, and translation (ISAT) uses crude lysates to test mutant ribosomes *in vitro*.

Separately, orthogonal populations of ribosomes and tRNAs were established in work by the Suga group through engineering the ribosome:tRNA interface in the 23S rRNA and the corresponding residues in tRNAs (**Fig. 4C**). Specifically, residues 2251-2553 in the 23S rRNA and residues 74-75 in $tRNA^{AsnE2}$ were varied, establishing orthogonal Watson-Crick interactions between the ribosome and tRNA in the A-site and P-site[29]. In theory, these advancements could be combined to create an orthogonal translation system that includes the mRNA, tRNA, and ribosome, and building upon previous works that established orthogonal aminoacyl-tRNA synthetases and elongation factors, this growing body of work is well-positioned to enable natural product synthesis using an entirely orthogonal translation system. These works support the notion that the ribosome can be engineered from multiple angles, and provide rich foundational work to build upon as we move forward to tailor the ribosome for custom functions. It is likely that engineering the ribosome for new chemistries will require tuning of multiple functions, such as message reading, tRNA selection, catalytic function, and product excretion.

Another key platform for *in vivo* engineering and testing of ribosomes is the series of strains with knockouts of the ribosomal RNA sequence on the genome (**Fig. 4D-F**). Often referred to as the Squires strains (developed in the laboratory of Catherine Squires), these strains survive on ribosomes encoded on a plasmid or a single operon on the genome[30]. Such strains are incredibly useful for testing ribosomal variants, which can either be encoded on a plasmid or directly altered on the genome. Both were key in the development of the tethered and stapled ribosomes[24, 25], and will most likely provide a foundation upon which much ribosome engineering can be performed *in vivo*. Of particular note is the convenience of using the Squires strain to easily test and select for ribosome variants that support life, since the mutant ribosomes are the only source of ribosomes in the strain. Such life/death selections are powerful, because many variants of the ribosome can be tested at once—for example, the selection is as easy as simply passaging a heterogenous population of Squires strain cells, each carrying a different variant of the ribosome that will be selected based on relative fitness. We expect that the ability to screen large libraries of ribosome variants in a pooled manner will uncover deep insights about the structure and function of ribosome variants in conjunction with advancements such as next-generation sequencing and DNA synthesis.

Platforms for ribosome engineering *in vitro*

Moving away from *in vivo* based ribosome engineering platforms, which offer much potential but present their own challenges associated with cell viability and dependency on enzymes to carry out necessary chemistries (such as tRNA charging), ribosome engineering *in vitro* has emerged as an exciting possibility. A rich history of biochemical experiments features *in vitro* reconstitution of the ribosomes, both wild type and mutant. Of note, ribosomes from *Thermus aquaticus* can be readily reconstituted at high efficiencies using *in vitro* transcribed rRNA, purified ribosomal proteins, buffers, and controlled temperature gradients[31, 32]. Thus, they might offer an exciting possibility for ribosome engineering. For the purposes of this text, we will focus only on key advancements that offer particular advantages for engineering the ribosome towards new chemistries, and gear our focus towards *E. coli* ribosome engineering to build upon the rich history of translation machine engineering that exists, such as the evolution of many orthogonal aminoacyl-tRNA synthetases. We will define *in vitro* ribosome engineering under the umbrella of any method that utilizes the ribosome in an *in vitro* translation reaction, meaning the ribosome can be generated either in cells or by other synthetic means.

Owing to the complexity of ribosome biogenesis, many methods take advantage of recombinant expression of ribosomes in living cells, followed by purification through ultracentrifugation and sucrose fractionation, then use those purified mutant ribosomes in *in vitro* translation reactions[33]. Once purified, mutant ribosomes can be used in both crude lysate or more purified *in vitro* translation reactions like the PURE reaction. However, expressing and purifying mutant ribosomes *in vivo* faces two main challenges: (1) the library will be biased towards those ribosomes who minimize disruption on cell viability (and hence exclude ribosomes that may have the engineered function, but disrupt life) and (2) wild type ribosomes are almost always present in the purified sample. Indeed, standard protocols for expression of mutant ribosomes inside cells typically yields less than 25% of the purified ribosomes to be mutant genotypes, the rest being wild type ribosomes[34, 35]. One possible option is to express mutant ribosomes with an MS2 protein-binding RNA aptamer sequence, and to use the MS2 protein to purify only mutant ribosomes containing the aptamer, but the technique often introduces contaminating wild type ribosomes and still suffers from limits around cell viability[36, 37]. A major breakthrough was in developing successful *in vitro* reconstitution of the ribosome using either purified rRNA from cells or *in vitro*-transcribed rRNA with the addition of ribosomal proteins under the right buffer conditions[38]. However, these ribosomes often lack key post-transcriptional modifications in their rRNA and thus suffer from decreased activity compared to 70S ribosomes purified from *in vivo* sources, or suffer from lower rRNA folding and assembly efficiencies compared to that in a cell.

Towards alleviating the assembly limitation observed for *E. coli* ribosomes from *in vitro* transcribed rRNA, a system based on crude cell lysates, termed ISAT (*in vitro* synthesis, assembly, and translation) was developed. Building upon advancements in cell-free protein synthesis systems, ISAT uses a crude cell lysate, which may offer an environment more like that of a living cell than a purified *in vitro* reaction, to transcribe rRNA from a plasmid (**Fig. 4G**). In the presence of ribosomal proteins, which can be purified from wild type ribosomes, ISAT offers end-to-end ribosome biogenesis, from rRNA synthesis to 70S ribosome particle assembly to translation of a specified protein, in an *in vitro* environment free from the constraints of cell viability and any contaminating wild type ribosomes[33, 39-41]. To do so, the ISAT system uses S150 crude cell lysates, generated through an ultracentrifugation step during lysate preparation to separate wild type ribosomes from cellular debris, and thus allows for building of mutant ribosomes with specified rRNA sequences. Recently, advancements in ISAT have led to significant improvements in both ribosome assembly and protein yields, highlighting its ability to be used towards ribosome engineering[39-41].

It is also possible that ISAT can be coupled to selection/screening schemes previously used in *in vitro* systems such as the puromycin-based selection used to identify ribosome constructs capable of better incorporating β- or D-amino acids given its open reaction environment. Recently, we showed successful coupling of ISAT to ribosome display, and as a proof of concept, evolved sequences of 23S rRNA that are resistant to clindamycin[42]. A particular advantage of ISAT is that addition of novel monomer-tRNAs into the reaction is readily possible, without the need to evolve a wholly new aminoacyl-tRNA synthetase. Evolving a new aminoacyl-tRNA synthetase, which may be required for *in vivo* ribosome engineering efforts, is difficult and faces a chicken-and-egg problem. A mutant ribosome may be needed to evolve a new synthetase, while a new synthetase may be needed to evolve a ribosome. However, many methods ranging from chemical synthesis to ribozyme-based reactions already exist to generate tRNAs charged with noncanonical monomers[43-46], and such tRNAs can be readily added to ISAT reactions owing to the open reaction environment. Such advantages make

ISAT a powerful platform to build upon for ribosome engineering, and we expect its further development will contribute meaningfully for engineering ribosomes.

In summary, many platforms and recent advancements in ribosome generation and evolution suggest ribosome engineering for new chemistries is within reach, and will require convergence of technologies developed on many fronts. These range from message reading (orthogonal ribosomes), active site engineering (tethered ribosomes and ISAT), ribosome generation (*in vivo* expression and purification or *in vitro* synthesis and assembly), and directed evolution (targeted mutagenesis and selection/screening for altered activities). A wide range of techniques, with some highlighted above, are available. However, it is important to remember that the ribosome cannot be evolved in isolation, and looking beyond the ribosome to other works in engineering the translation machinery will be necessary for any meaningful progress.

Escaping the ribosome's evolutionary trap: a structural view

"You're braver than you believe, stronger than you seem, and smarter than you think."
-**A. A. Milne**

Author's note: The following section is a 'behind the scenes' look at my PhD, beyond what may be presented in more scholarly text as presented in corresponding manuscripts. It may be helpful to younger graduate students, or those of you who might be more curious on how the projects presented in this dissertation actually came about. If you are more interested purely in the scientific data presented, I would advise skipping this portion as well as the forewords in each following chapter but I do think it is helpful in framing the way I think about the ribosome came about, and how thinking about the same problem from multiple angles, which is a not an inadequate way to describe my doctoral work in brief, can bring about innovation. As a result, the following section is written in a perhaps less scholarly way than the other chapters and more in the fashion of storytelling, but as a result might be easier to read.

Early in my days of engineering the ribosome with hopes of endowing new functions, I realized quickly the 'tug-of-war' between ribosome function and evolutionary conservation. That is, the ribosome has been extensively optimized in evolution for its natural function, the polymerization of amino acids (specifically a-amino acids, referring to the position of the primary amine group) into polypeptides. Based on current literature, it seems unlikely that there would be a 'general' ribosome, which is capable of robustly polymerizing non-canonical, backbone-modified amino acids (or even more exotic monomers that don't form peptide bonds) as well as maintaining its original function. Thus, if you think of engineering the ribosome as traversing the 'peaks' and 'valleys' of evolutionary landscapes, could you, through a series of changes, dig yourself out of the valley that is the ribosome's current sequence, structure, and function? And on the way out of this valley, how do you discern between ribosomes that are totally unfunctional, and those which hold promise towards new functions?

This was the question I wrestled with as I thought about how to successfully engineer the ribosome, and I quickly hypothesized that current paradigms may not be adequate, or at least would not be practical for our ambitious goals. Thus, I turned the focus of my doctoral research towards two main aims:

1. To develop new methods that allow co-evolution of multiple ribosomal parts
2. Apply methods of *design* not readily available to human intuition to engineer the ribosome

Aim 1 came from the realization that the ribosome's map of sequence-structure-function is incredibly complex and interconnected, so unlike some protein enzymes that can alter substrate preferences with a limited number of residue changes, repurposing the ribosome will require that we change multiple residues simultaneously, and be able to read out the cooperativity of changes. This mostly stemmed from my penchant for elegant molecular biology methods (like isothermal assembly of DNA) that, when applied correctly, has far-reaching effects on many different areas, and I saw this underlying method to not only be applicable for the ribosome, but to any complex macromolecular machine the exhibits high epistasis among its residues.

Aim 2 was motivated by the realization that to engineer the ribosome for new monomers may (most certainly) require deviation from its current architecture, and efforts to do so are currently hindered by the overall complexity of the ribosome's structure-function relationships, which we have a generally poor understanding of. For example, beyond 'the peptidyl transferase center', can we point to a target in the ribosome for engineering for a given desired function? Even with the enormous number of high-resolution ribosome structures, we have yet to clearly identify the contributions of each component in the machine. Thus, I explored the application of computational algorithms for parsing through and annotating ribosome structures for engineering targets. Truth be told, my turn towards computational algorithms to parse the ribosome was motivated by long periods of time spent staring at *my computer screen, trying to understand the minutiae of the ribosome's various helices and motifs, and trying to build a map of all the numerous contacts (RNA-RNA, RNA-protein, protein-protein) present in the ribosome structure. Quickly realizing the inability to scale my approach, I, through conversations with Mike and inspiration from the origin of life I was reading at the time, decided to minimize the ribosome. This would allow me to reduce its complexity and along the way, get a sense for how permissible to engineering the ribosome is. At a fundamental level, the perturbations made to ribosome biogenesis through the absence of certain ribosomal parts could help develop a better understanding of rRNA folding, which remain to me one of the biggest mysteries of the ribosome.

At the heart of the two major aims of my doctoral work is the effort to escape the 'valley' of evolution. One continual challenge of performing selections on the ribosome was This, to me, meant that incremental changes to the ribosome, *a la* error-prone PCR, may not be enough to climb out of the valley if employing selections where the wild type ribosome can squeeze through. In other words, the polymerization function of the wild type ribosome is relatively so much greater than mutant ribosomes from the neighboring sequence space such that in a selection, even a small amount of wild type contamination will result in levels of noise that are too high for meaningful discovery. Thus, I turned my focus towards generating ribosomes that are notably different than the wild type ribosome—not only in their sequence and also in their architecture.

This was also motivated by my push to think of the ribosome from a structure-first perspective, realized while scrolling through a plasmid encoding the *rrnB* operon, which, fondly known as pAM552, was my main interaction with the ribosomal RNA sequence in my first two years of graduate work. There was just so much information being lost when "viewing" the ribosome in its primary sequence that couldn't be captured in one dimension. I went back in the ribosome literature, and reread every paper in my library to that point—the manuscript on the left, and a PyMOL window open with a ribosome structure on the right. This became standard practice until I was able to visualize exactly where in the ribosome structure a paper was exploring. After some time (~110 manuscripts later), my effort to relearn the ribosome reshaped the way I would think about the machine. And this led to the ideas that fueled the two main projects in my PhD, 1) the evolution of the tethered ribosome and 2) ribosome minimization. **The connecting theme in both of these efforts is to provide the synthetic biologist, who seeks to engineer the ribosome for new functions, a different 'takeoff point' for ribosome engineering, such that they are not trapped in the deep valley of evolutionary convergence that the wild type ribosome currently occupies.**

My optimistic vision is that these works will provide the foundation upon which ribosome engineering can be accelerated, and realize the goals of repurposing the translation apparatus that has transformative potential.

3D-structure-guided evolution of a ribosome with tethered subunits

Foreword: Why further evolve the tethered ribosome?

Developed between the Jewett (Northwestern University) and Mankin (University of Illinois at Chicago) labs, Ribo-T covalently links together the 16S and 23S rRNAs from the small and large subunits, respectively, in a single chimeric rRNA through RNA tethers[24]. This tethered ribosome can then be directed to operate alongside the wild type ribosome in a living cell by mutating the anti-Shine-Dalgarno sequence in the 16S rRNA of the small subunit to match a corresponding mutated Shine-Dalgarno sequence in select mRNAs. Because the small and large subunits are now covalently linked, the large subunit of Ribo-T is now also sequestered away from the wild type ribosomes in the cell, and thus can be freely engineered for objective functions.

Although Ribo-T represents an exciting opportunity for engineering the ribosome in living cells, one critical limitation is its relatively diminished function compared to the natural bipartite ribosome. Part of the limitation may arise from the fact that the 23S rRNA is circularly permutated to enable this tethering, which connects Helix 101 (H101) of the 23S rRNA to Helix 44 (h44) of the 16S rRNA[24]. Since the natural 5' and 3' ends of the 23S rRNA are, although base paired, not proximal to H101, there likely are deficits to this new circularly permutated version of the 23S rRNA in rRNA folding and more broadly, ribosome assembly that is reflected in the diminished function of Ribo-T. There is also the fact that the 23S rRNA, now flanked by the 16S rRNA on the 5' and 3' end, also lacks its natural processing stems, which are known to aid correct processing and assembly of the 23S rRNA into a mature 50S subunit[47]. Thus, increasing the overall function of Ribo-T as a ribosome in the cell was an attractive target for the biological engineer.

At the beginning of my PhD, I worked with Erik Carlson to evolve Ribo-T to improve its function as an orthogonal tethered ribosome[48]. Conversations with friends and colleagues in other labs revealed that there were already many efforts to engineer Ribo-T for new catalytic efforts that were under way or actively being planned, and thus we felt that it would be greatly useful for the community to optimize Ribo-T function to enable the many current and future efforts. In this effort, we optimized the tether regions (work carried out by another graduate student) and in parallel, pairs of Shine-Dalgarno (SD)/anti-Shine-Dalgarno (aSD) sequences that enabled its function as an orthogonal ribosome in the cell. In the end, we combined the improved tether sequences and improved pairs of SD/a-SD to showcase Ribo-T v2.0's ability to expand the chemistry of life. However, the work left me with a keen disappointment in our methodology. The selection of improved tether sequences as well as SD/aSD pairs occurred both through picking clonal samples and Sanger sequencing, which greatly limited the throughput of sequences being evaluated in our library. Secondly, libraries were designed in a single pass, meaning we decided on testing varying length or sequence, but not both. At the time, this seemed a good exploratory approach to see if randomizing and selecting alternative tether sequences would help at all, but in retrospect, as I started to imagine the ribosome from a structure-first point-of-view, fell short of taking into the account the nuances of RNA tether structure and its many possible conformations.

The advancement on this work, my main motivation to pursue the development of Ribo-T v3, would come in the middle of my main PhD project around minimizing the ribosome. It was the convergence of three main things: reviewer comments on Ribo-T v2.0 (one in particular—asking why we didn't carry out selection in liquid culture as to allow different variants of the tethered ribosome to compete directly with each other), my fascination with the application of next-generation sequencing, and my now structure-first perspective on thinking about ribosome function. I knew that applying liquid cultures to selecting a better tethered ribosome would be the most straightforward: after we make the library and transform it into the Squires strain, we could simply collect the surviving colonies off of the agar plate, and introduce them into the liquid culture. However, it would still be subject to the same limitation in throughput that our previous work developing Ribo-T v2.0 suffered from, which would involve plating a dilution of the selection culture, then picking clones to proceed to Sanger sequencing. The limitation, I realized, was in the sequencing (screening winning genotypes).

Most applications of next-generation sequencing (as a testament to how quickly biotechnology moves, PacBio has since rapidly made high-fidelity long read sequencing a reality, although it is still with limitations in terms of read depth compared to Illumina), which is performed on Illumina machines, are limited to read lengths ranging from 75 to 600 bases. Thus, if multiple regions of a molecular machine are evolved simultaneously, how does one link those two regions together? Intuitively, it made sense that the effect of each tether on ribosome function was not simply additive, but more likely cooperative. Examples of potential solutions to this problem were popping up in literature, which let me know that solving this problem could be valuable beyond the ribosome. Most required custom bioinformatic pipelines, which, to a predominant experimentalist, often are out of reach in terms of implementation. That day, I found myself helping a lab mate with a cloning problem, where his backbone was closing in on itself without the desired insert.

"All I'm getting are the sticky ends on my backbone stuck together—who would ever want that?"

-Frustrated lab mate, 2019

I knew at that moment that we had a solution to the read length problem. Without any new experimental techniques, a simple PCR-ligation-PCR step, closing the “backbone” of a plasmid to make adjacent two previously distant regions, would allow high-throughput evolution of the ribosome tethers, which were separated by the circularly permutated 23S rRNA. This was a very satisfying demonstration of how to think about the ribosome from a structure-first perspective: the tethers were likely close in three-dimensional space and thus likely to interact, so it made most sense to evolve them simultaneously. What followed was the development of Evolink and Ribo-T v3.

Abstract

RNA-based macromolecular machines, such as the ribosome, feature functional parts reliant on atomic tertiary interactions spanning sequence-distal regions. These features hamper the engineering potential of such machines because they limit evolutionary exploration of mutational libraries and confound 3D-structure-guided design. To address these challenges, we describe Evolink, a method that enables high-throughput evolution of sequence-distant regions in large molecular machines, and computer-guided library design principles to enable thorough exploration of structurally stable designs. To showcase the utility of our approach, we evolved a tethered ribosome, which improves upon previous iterations by 56% in orthogonal protein translation with a nearly 2-fold improvement in growth in minimal media. The Evolink approach enhances the engineering of macromolecular machines for new and improved functions with broad-reaching applications in synthetic biology.

Introduction

Directed evolution of RNA- and protein-based enzymes can elucidate principles of biological design and generate new catalytic activities for synthetic biology [13, 42, 49-54]. Unfortunately, methods for directed evolution can be hindered by practical considerations. For example, the combinatorial space for evolution is immense (i.e., for an average protein of length 300 amino acids, there are a seemingly infinite number of possible amino acid sequences (~10^{390})), and random mutagenesis alone cannot screen all possible variants [48, 55-57]. In addition, macromolecular machines often have complex tertiary structures that contribute to their function[58], which are close in three-dimensional space but distant in primary sequence (**Fig. 5A**). This limits the ability to recover winning designs even when effective selections can be employed. Such practical limitations are exacerbated in especially large macromolecular machines, such as the bacterial ribosome, which has 3 ribosomal RNAs (rRNAs) comprising ~4500 nucleotides (i.e., 16S rRNA, 23S rRNA, and 5S rRNA) and 54 proteins [13, 48-51, 54, 59].

Despite these challenges, directed evolution of the ribosome has emerged as a promising opportunity in chemical and synthetic biology [13, 42, 48-52, 54, 59-66]. The key idea is that the ribosome can be repurposed for diverse genetically encoded chemistries to create new classes of enzymes, therapeutics, and materials by selectively incorporating non-canonical monomers into peptides and proteins. While this works well for many non-canonical □-amino acids, there is poor compatibility with the natural translation apparatus for numerous classes of other non-canonical monomers (e.g., backbone-extended amino acids (□□□□□□□□□□□ etc.)) leading to inefficiencies in incorporation [13, 19, 43, 49-51].

New methods for engineering ribosomes have been developed to address these inefficiencies[33, 42, 61, 62, 67]. *In vivo*, these methods have focused on the engineering of specialized ribosome systems. Recently, the advent of tethered ribosomes has made possible the first fully orthogonal ribosome-mRNA system in cells, where a sub-population of ribosomes are available for engineering and are independent from wild type ribosomes supporting cell life [63]. Tethered ribosome systems have two key features. First, the anti-Shine-Dalgarno sequence of the 16S ribosomal RNA (rRNA) of the small 30S subunit can be mutated to function as orthogonal ribosomes that selectively initiate translation of orthogonal mRNAs with mutated Shine-Dalgarno sequences.[3] Second, the small and large subunits are covalently linked together. In the initial tethered ribosome system, termed Ribo-T, the core 16S and 23S rRNAs were joined together to form a single chimeric molecule via helix h44 of the 16S rRNA and helix H101 of the 23S rRNA [63]. Importantly, by selecting otherwise dominantly lethal rRNA mutations in the large ribosomal subunit, Ribo-T can be evolved to synthesize protein sequences that are not accessible to the natural ribosome. Since the initial discovery of Ribo-T and a subsequent similar stapled design [60], new orthogonal Ribo-T/mRNA pairs, as well as tether sequences have been optimized using directed evolution methods [48]. Specifically, tether residues were randomized in sequence but not in length [48], or mutations to residues surrounding a fixed RNA linker (the J5/5a junction from the *Tetrahymena* group I intron) were investigated [59]. Despite the improvement, the potential of tethered ribosome systems remains limited by the fact that they are not as active as wild type ribosomes.

The untapped potential and existing inefficiencies of tethered ribosome systems motivate the need for new directed evolution-based approaches to engineer these systems. Previous works, however, were limited in throughput in evaluating many designs (48 and 108 members were evaluated in two different efforts [48, 59]) due to their reliance on clonal isolation and functional testing. A bottleneck of these efforts is that the regions of interest in the tethered ribosomes are separated by around 2,900 nucleotides (the length of the circularly permuted 23S rRNA[63]), and current readily available methods for next-generation sequencing are typically limited to overlapping read lengths of ~300 nucleotides. While methods have been developed to address these shortcomings [68, 69], they face limitations that are not broadly applicable to machines as large as the ribosome. Briefly, they rely on custom bioinformatic pipelines, barcoding strategies inherent to protein-based machines, or are limited in the distance between regions of interest. Thus, they were not easily applicable to large RNA-based machines like the ribosome.

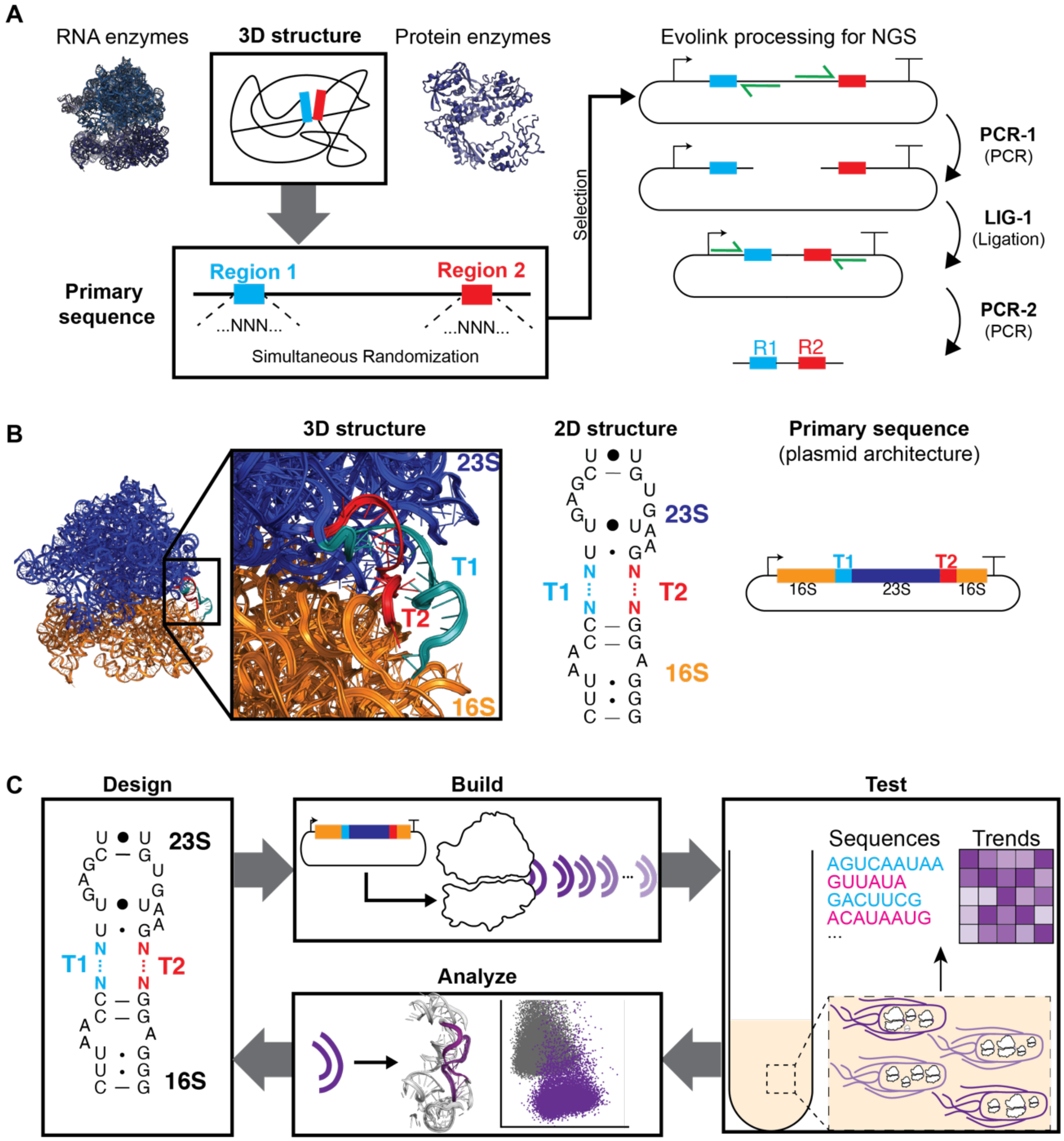

Figure 5. **Overview of Evolink and tethered ribosome design and evolution.** A) RNA-based and protein-based enzymes with regions (Region 1 & 2, blue and red, respectively) that are distal in primary sequence but proximate in 3D space, and likely functionally linked. Molecular biology steps of Evolink (PCR-1, LIG-1, PCR-2) to link regions together in a single amplicon that enable overlapping next-generation sequencing (NGS) readouts. DNA oligos (green), can be flexibly designed depending on the machine architecture encoded on a plasmid. B) Rosetta-predicted structure of a previously reported tethered ribosome showing tethers, denoted T1 and T2, in 3D space as well as likely secondary structure representation. Representative encoding plasmid (right) is shown. C) The Design, Build, Test, & Analyze evolution scheme. (Test) includes selection, Evolink, and the resulting NGS reads. (Analyze) involves Rosetta modeling to infer tether structure and predicted stability. Results from each round feed into (Design) and (Build).

Here, to facilitate evolution of ribosomes, we present a molecular biology technique called Evolink (**Fig. 5A**). Evolink connects two or more regions of RNA sequence that are distal in primary space but proximal in 3D structure to enable next generation sequencing readouts of winning phenotypes. We augment Evolink by integrating computational modeling with the design-build-test cycles of directed evolution to inform library design (**Fig. 5B-C**). We apply this integrated method to evolve the tethered ribosomes for improved function by targeting the rRNA residues involved in connecting the 16S and 23S rRNAs. We identify a newly evolved tethered ribosomes (termed Ribo-T v3) that increases ribosome function nearly two-fold when supporting cellular growth in minimal media. Further, we demonstrate the compatibility Ribo-T v3 with non-canonical monomer incorporation in an in *in* vitro protein synthesis reaction. The combination of *Evolink* with computational modeling allows for more efficient evolution of macromolecular machines with complex structures, such as the ribosome, featuring regions distant in primary sequence but functionally linked in spatial proximity. We anticipate the Evolink approach will be valuable for future engineering of ribosomes and other macromolecular machines.

Results

Linking of distal regions on a single next-generation sequencing read

We aimed to develop a generalizable method, guided by computational design, for directed evolution of sequence-distal sites of macromolecular machines. As a model, we focused on evolving the tether sequences of covalently linked ribosomes. To achieve our goal, we first developed the molecular biology methods of our technique, termed evolution and linkage (Evolink). Evolink is a three-step process that uses polymerase chain reaction (PCR), ligation, and a second PCR reaction to bring together sequence-separated regions of a plasmid into a single next-generation sequencing (NGS) read. This process is analogous to amplifying and closing the "backbone" of a plasmid, where the "insert" omitted from amplification is the RNA sequence separating the two regions of interest. Because Evolink relies on simple, general-purpose molecular biology (e.g., PCR and ligation), it can be adapted to any plasmid-encoded molecular machine (**Fig. 5A**).

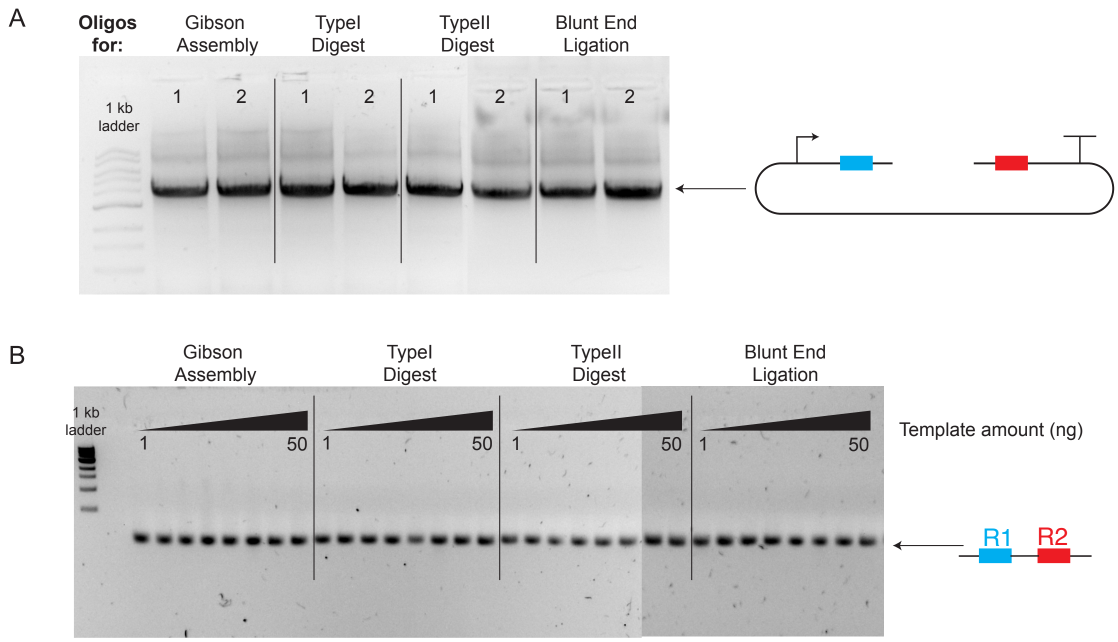

Figure 6. Proof of concept study for library preparation workflow of Evolink. A) A clonal sample of the tethered ribosome (Ribo-T v2.0) is linearized using different oligos compatible with multiple ligation protocols. B) From the different ligation products, generation of final amplicon for next-generation sequencing can happen with a wide range of ligation methods and starting template amounts in the PCR.

To start, we demonstrated the three key molecular biology steps of Evolink (termed PCR-1, LIG-1, PCR-2) (**Fig. 5A, right**). Using a clonal plasmid sample encoding Ribo-T v2.0[48] (**Fig. 6**), we initially carried out around-the-world PCR (PCR-1) with a high-fidelity polymerase (Q5 DNA Polymerase) using oligonucleotide primers specific to the plasmid. In our architecture, in which T1 is upstream (5') of T2, the forward primer binds upstream of T2, and the reverse primer binds immediately downstream of T1, so the first set of primers for PCR-1 are "inside" the two regions of interest. The PCR-1 primers play two key roles. First, the sequence between each respective primer and region of interest (reverse primer-T1 and forward primer-T2 in this case) determines the length of the final amplicon for use in NGS. Second, the primers can encode compatible DNA sequences with either an overhang (for restriction enzyme-based or isothermal assembly[70]) or blunt ends to be used in the subsequent ligation step (LIG-1). We assessed the compatibility of PCR-1 with multiple primer sets that feature designed overhangs for Type I/II restriction enzyme digestion, 5' phosphorylation for blunt-end ligation, or overlapping complimentary sequences for isothermal assembly. As expected, we found the first PCR step (PCR-1) to be successful with all four primer sets that featured different 5' modifications (either phosphorylation or custom sequence) (**Fig. 6**).

Following the first PCR, LIG-1 was carried out to circularize the product of PCR-1 in a unimolecular ligation, proximally linking the previously distant regions. Prior to ligation, PCR-1 products that used primers compatible with restriction enzyme digests were processed with enzymatic digest and purification. Those which used 5' phosphorylated primers were purified and used in ligation with T4 ligase, and those which featured overlapping complementary sequences in the primer sets were subject to isothermal assembly.

Finally, we carried out PCR-2 with a different set of primers to amplify the now-linked regions of interest. In this step, the primers are designed with the forward primer upstream of T1 and the new reverse primer downstream of T2, such that now the primers are "outside" of the regions of interst. The sequences between each respective primer and region of interest (forward primer-T1 and reverse primer-T2 in this case) contribute to the final amplicon length for sequencing. We designed primers such that the final amplicon product is ~200 nucleotides (nts) in length, and can be directly used in NGS library preparation. To demonstrate robustness, we tested four different ligation methods (Type I/II restriction enzyme digestion and ligation, blunt end ligation, and isothermal assembly), each with eight (1, 2, 5, 10, 20, 30, 40, 50 ng) different input template amounts to the final PCR. We observed successful generation of the desired amplicon for NGS for 32/32 reactions tested (**Fig. 6**). To reduce any possible biases, we moved forward with blunt-end ligation because it does not rely on any particular DNA sequence and it required the minimum amount of template tested (1 ng, **Fig. 6B**).

Applying Evolink to tethered ribosomes

With the Evolink method in hand, we sought to apply it to select and evolve mutant tethered ribosomes for improved activity, with a focus on tether design and evolution (**Fig. 5B**). Central to our efforts was the iterative application of our design-build-test-analyze (DBTA) cycle (**Fig. 5C**), in which multiple libraries can be tested, each library subsequently building upon results and analysis of the ones prior, to improve molecular function. This departs from previous efforts that carried out a single pass of library design, building, and selection/screening, which limits the breadth of the libraries to be tested. The study was carried out with the notion that we would first start broadly, then through our DBTA cycles, test our hypotheses on tether design and narrow our search space with each cycle to arrive at an improved molecular machine.

Specifically, we looked to improve upon Ribo-T v2.0 function by optimizing the tether for length and sequence composition over multiple rounds of design and evolution. The guiding principle was to leverage the throughput of Evolink and post-facto structural modeling to evolve the RNA residues that make up the tethers. Critically, we looked to explore both sequence and length variations, and allow the results of each round of selection to inform the library design of subsequent rounds. Because Evolink makes use of next-generation sequencing, our approach allows for substantially larger sampling and screening of the solution space compared to past efforts.

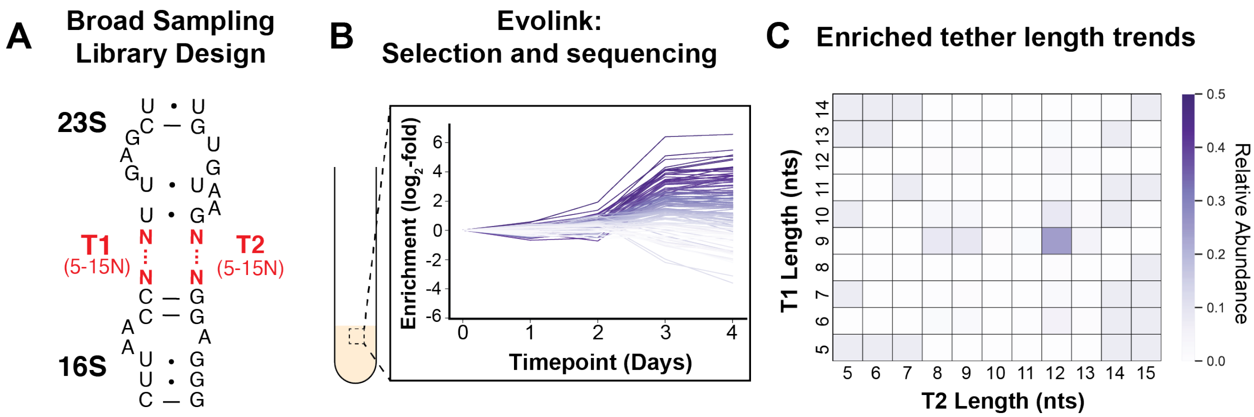

Figure 7. Results of the Broad Sampling and Tether-23S junction libraries. A) Tethers with randomized sequence and length chosen for this library. B) Fold-enrichment (log_2) of tether pairs during selection in liquid culture over four timepoints. C) Analysis of the NGS results reveals convergence towards 9 and 12 nucleotides for T1 and T2 regions, respectively.

We generated the first library via PCR followed by Gibson Assembly using oligonucleotides containing degenerate sequences ranging from 5 to 15 residues for the tether, electing to broadly sample possible lengths and sequences of T1 and T2. (**Fig. 7A**) Following construction, the library of tether designs (library size estimated to be 10^6 limited by transformation efficiency) was cloned and transformed into an *E. coli* strain lacking *rrn* operons on the genome[30] Viable cells, which were growing exclusively off the tethered ribosomes, were identified by growth on agar plates containing erythromycin, sucrose, and carbenicillin[48, 63]. Resulting colonies were collected from these plates and selection *via* liquid culture was carried out (**Fig. 7B**). By passaging cells in liquid culture for approximately 40 generations, we hypothesized that faster growing mutants would become more enriched in the culture. Evolink and analysis of subsequent NGS reads was applied to these cells at one of each time point, which were taken each day over four days. Importantly, using Evolink, T1 and T2 sequences, which represent the two strands of RNA that make up the tether, were directly linked in a single amplicon, taking advantage of overlapping reads which improve sequencing fidelity to improve our confidence in identifying pairwise interactions between the two regions. NGS analysis revealed a range of enrichments for many genotypes observed over the passaging time course (**Fig.**

7B). Specifically, we observed enrichment (log_2-fold change) values between -5 to 6, and ~1800 unique genotypes after the LB-agar-based selection converging to ~450 unique genotypes over the time course (**Fig. 7B**, **Fig. 8A**).

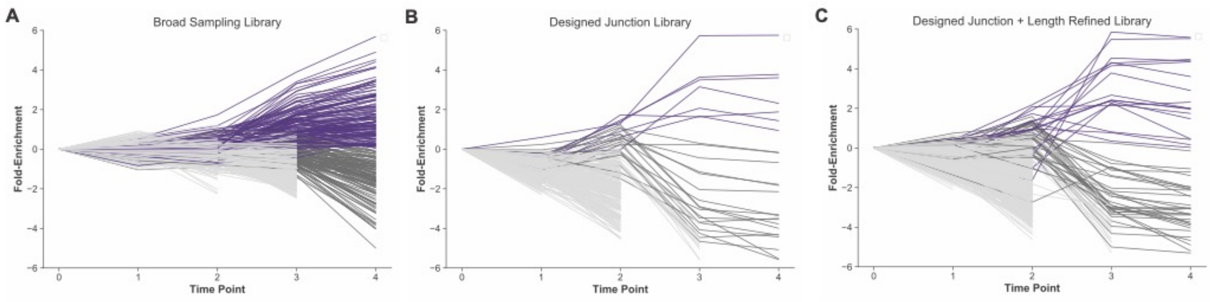

Figure 8. Enrichment of individual genotypes throughout full Evolink experiment. Genotypes that are positively enriched at the final timepoint are depicted in purple. Genotypes that are negatively enriched at the final timepoint are depicted in dark gray. Genotypes that drop out during selection (does not appear past a certain timepoint) are indicated in light gray. Generally, across the three libraries tested in this work, the (A) Broad Sampling Library, (B) Designed Junction Library, and (C) Designed Junction + Length Refined Library, a wide range of enrichment values are observed. Interestingly, more genotypes drop out of selection in the latter two libraries, indicating stronger relative selection.

Two key features emerged from these data. First, the same T1 sequences paired with multiple T2 sequences. For example, T1: 5' CAGGGUACACC 3' paired with T2: 5' CCCAUUCA 3', 5' AUUCACUUGG 3', and 5' CGACGAGCG 3' to yield enrichment values of 5.69, 2.17, and -1.5, respectively. These data suggest that contributions of the two tether sequences to overall ribosome assembly and function depend on each other and are not simply additive. Second, we observed a trend in the sequencing data towards optimal tether lengths, converging upon a length of 9 nucleotides for T1 and 12 nucleotides for T2 (**Fig. 7C**).

Investigation of the Tether-H101 junction

Based on previous literature that showed that stapled ribosome function is sensitive to the connection between the Tether-23S rRNA connection[59] (henceforth referred to as the Tether-H101 junction), we wondered if the Tether-H101 junction would also be significant in the Ribo-T design context (**Fig. 11A**). [48, 63] To explore this hypothesis, we fixed the tether identity according to the Ribo-T v2.0 sequence [48] and constructed a library which consisted of every possible deletion in the 23S-tether junction region (**Fig. 11B**). We tested every combination of base deletions on either strand, starting from the tether and moving towards H101. This allowed us to approach the problem from an unbiased perspective, without preexisting assumptions on whether these residues indeed exist in a base-paired helical form or in another rearranged architecture. Following library construction, we again tested for the ability of these library members to support growth in the Squires strain. Evolink results on this library converged to 5' GCG 3' and 5' CGC 3' in Region 1 and Region 2, respectively, revealing that base changes in the Tether-H101 junction region indeed affects ribosome function (**Fig. 11C**). Our results suggested that the folding behavior of this junction may have a significant influence on both tethered ribosome structure and function. To further test and understand this hypothesis, we turned to computational modeling to gauge structural stability of the Tether-H101 junction.

The key idea was to use modeling (secondary structure modeling with ViennaRNA[71] and tertiary structure modeling with Rosetta FARFAR2[72]) to better understand any possible structural features that may be contributing to improved tether RNAs and overall ribosome function, and use that to inform subsequent library design. Notably, because the degenerate libraries being tested are beyond practical limitations for exhaustive testing (i.e. transformation efficiencies), the use of computational modeling to improve library design was key in our approach to efficiently arrive at improved tethered ribosome variants.

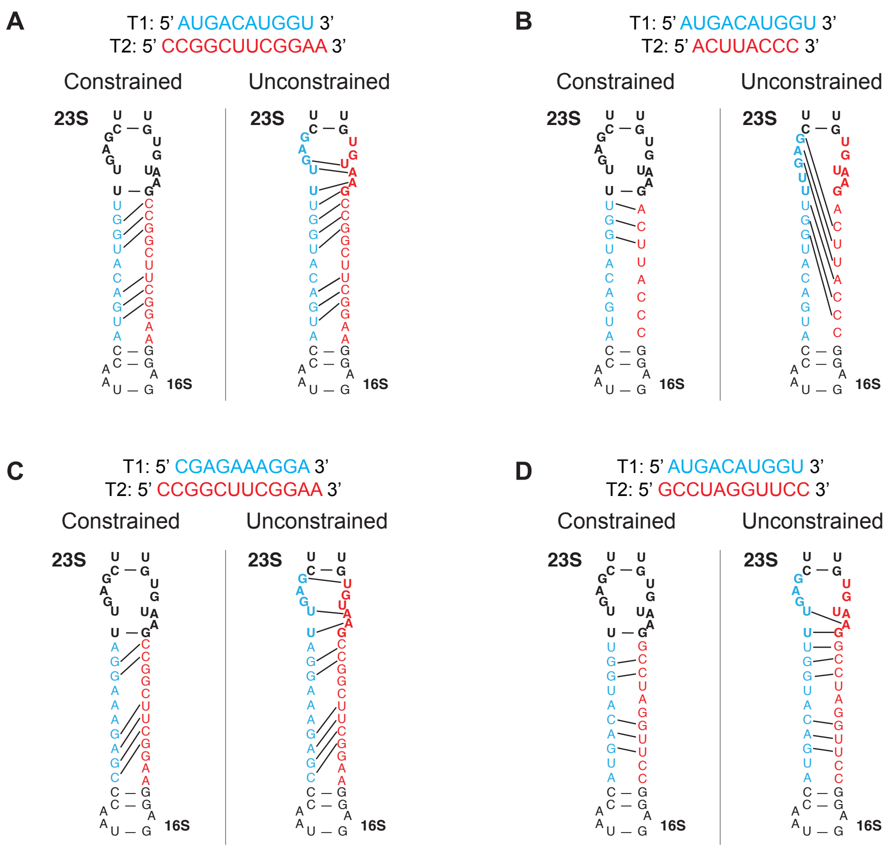

Figure 9. Analysis of enriched genotypes from the Broad Sampling Library. Each panel (A, B, C, and D) shows an enriched sequence modeled using RNAcofold. For three of the genotypes (Panel A, C, and D), the same tether base pairs are formed in the constrained and unconstrained minimum free energy (MFE) structures. For one of the genotypes (Panel B), significant rearrangement is observed between the constrained vs. unconstrained MFE structures.

First, we used RNAcofold[71] to conduct secondary structure predictions on four most prevalent tether sequences that emerged from the Broad Sampling Library (e.g., a 10 nucleotide (nt)/12 nt tether, T1: 5' AUGACAUGGU 3' T2: 5' CCGGCUUCGGAA 3') to assess the degree to which the tether's structure was independent of surrounding residues from native rRNA sequences (**Fig. 9**). Because the tethers may likely interact due to their proximity in three-dimensional space, we looked to investigate likely base pairs between the tethers to help frame the extent of their possible interactions. To assess the independence of the tether's structure relative to its surrounding context, we carried out simulations of the tether residues using ViennaRNA under two different conditions. The first, termed 'unconstrained' simulations, allowed the adjacent 23S rRNA junction (Helix 101 in the wild type ribosomal 23S rRNA) to 're-fold'. In other words, this simulation is absent of constraints forcing the junction to assume base pairing observed in the structure of the native ribosome. In the second, termed 'constrained' simulations, the 23S rRNA junction residues are fixed to base pair and assume base pairing as seen in the native ribosome structure. In a tether with perfectly independent folding, the base pairing in constrained and unconstrained simulations would be identical, and the adjacent 23S rRNA junction would additionally base pair as it does in the wild type *E. coli* ribosome. For three of four tethers, the same tether base pairs formed in the constrained and unconstrained structures, but the adjacent 23S junction only maintained its wild type structure in one case (**Fig. 9A, C, D**). For the remaining tether, significantly different RNA secondary structures were observed between the 'constrained' and 'unconstrained' models (**Fig. 9B**).

In 3D modeling, which we conducted independent of these secondary structure predictions, augmented this picture (**Fig. 10A-D and Fig. 11D-G**). We used Rosetta's RNA fragment assembly code[72] to model analogous constrained and unconstrained states of the tether with FARFAR2 (**Fig. 10A-D and Fig. 11E and F,** respectively). For each tether, the constrained and unconstrained simulations resulted in different results (**Fig. 10A-D and Fig. 11G**), suggesting that this junction was inadequately stabilized. Another possibility is that the three-dimensional structural prediction is highly inaccurate, but we would expect the correlation with highly selected structures with predictions to be weak. For further refinement of tether design and evolution, our results from investigating the Tether-H101 junction, both experimentally and computationally, led us to employ optimization of both tether length/sequence as well as structural reinforcement of the Tether-H101 junction.

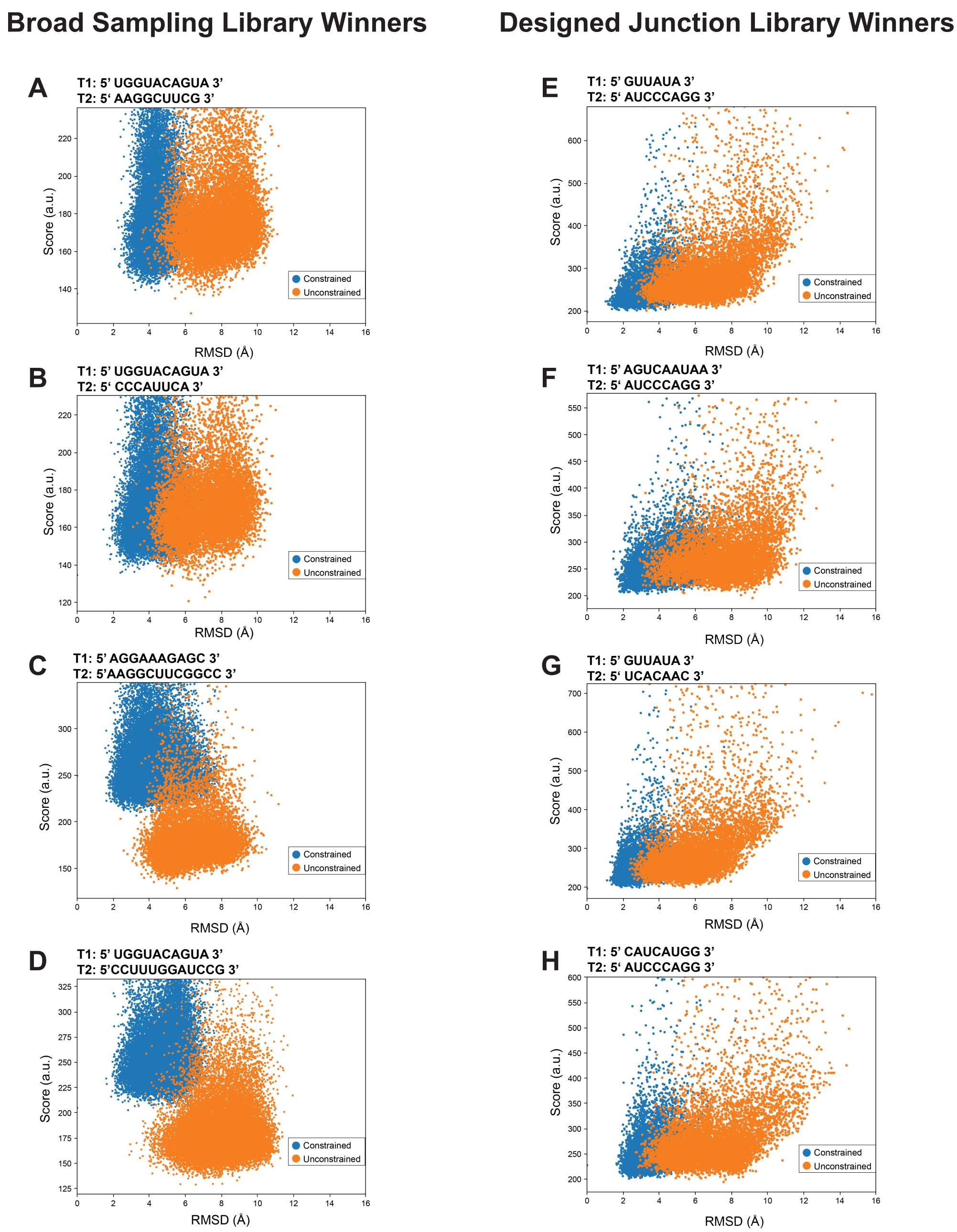

Figure 10. Score vs. Root-Mean-Standard-Deviation analysis of FARFAR2 simulations of enriched tether sequences. (A-D) For the Broad Sampling Library, we observe significant differences between the constrained (blue) and unconstrained (orange) simulations, referring to fixing native structures of the 23S-tether junction. Of the four modeled genotypes, two sequence (Panels C and D) exhibit particularly significant differences, hinting at structural instability in the tether and/or Tether-23S junction. (E-H). When similar simulations are performed with enriched tether sequences from a library with a designed Tether-23S junction, the results of FARFAR2 simulations are more agreeable between constrained vs. unconstrained sequences.

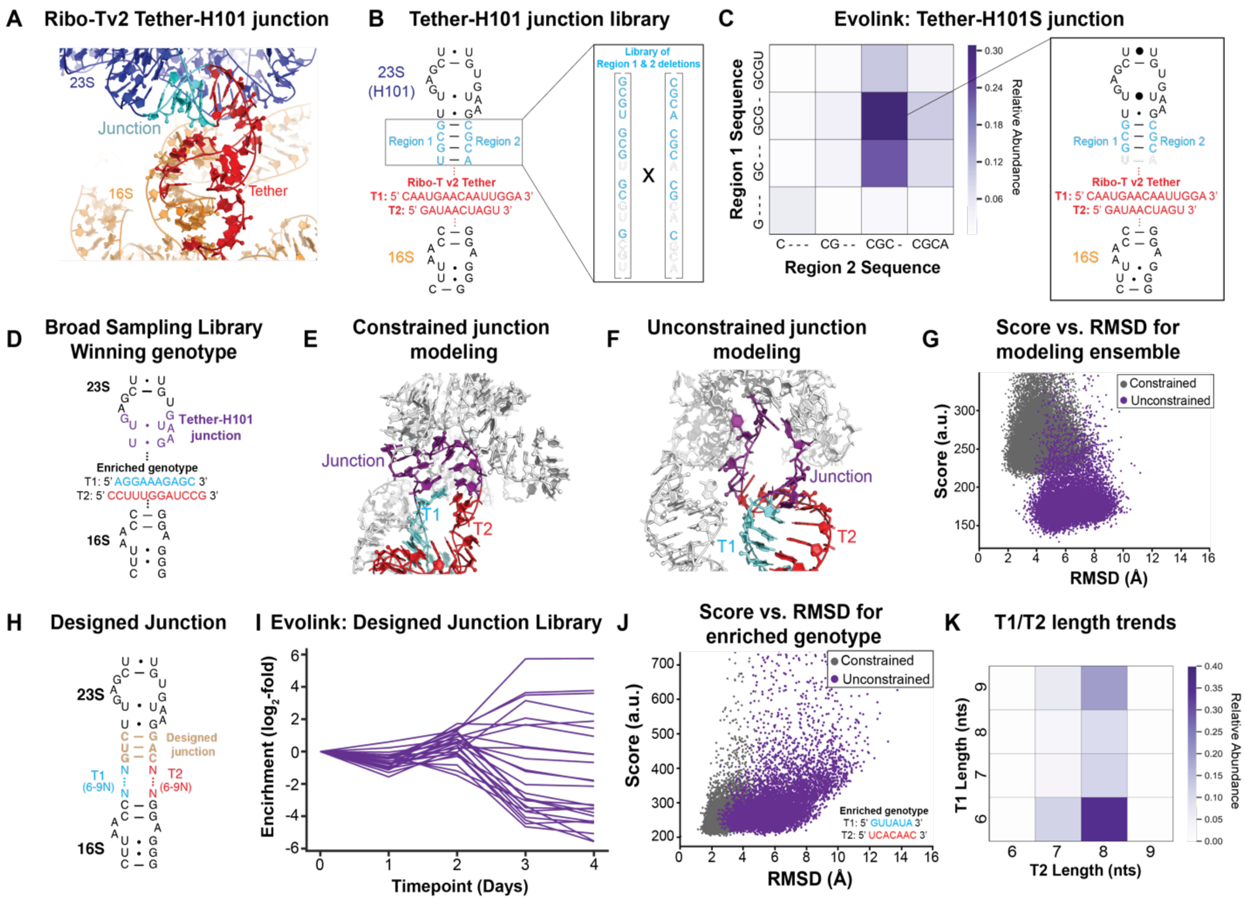

Figure 11. Investigation of the Tether-H101 junction and integration of designed junction into library design. A) Rosetta modeling of the Ribo-T v2 tether and surrounding residues. The junction (cyan) consists of nucleotides that connect the tether (red) to the rest of H101 (blue) in the 23S rRNA. B) Secondary structure depiction of the library for testing deletion effects in the junction. C) Results from Evolink showing convergence towards specific Ribo-T v2 Tether-23S junction sequence. Data shown are from a pooled sequencing run of three independent experiments (n=3). D) The sequence of T1 and T2 tethers selected from the Broad Sampling library. E) & F) Rosetta modeling of the Tether-23S junction (purple) show significant differences between enforcing or not enforcing (constrained vs. unconstrained, respectively) native base pairing. G) Rosetta score vs. Root-Mean-Standard-Deviation (RMSD) for constrained and unconstrained models of the enriched sequence. H) Library with designed Tether-23S junction, reinforced by three synthetic base pairs (gold). I) Representative fold-enrichment ($\log_2$) of tether sequences from selection and Evolink on the designed Tether-23S junction library. J) Heatmap of relative abundance of tether lengths showing convergence towards 6 and 8 nucleotides for T1 and T2, respectively. K) Rosetta score vs. RMSD for constrained and unconstrained models of an enriched sequence from the designed library. Data shown are from a pooled sequencing run of three independent experiments (n=3).

Evolink and computational validation of a designed tether library

With the range of tether lengths informed by the broad sampling library and the designed base pairs at the Tether-H101 junction informed by computational modeling and experimental validation, we next performed Evolink on a tether library (initial library size estimated ~10^6) guided by 3D-structure analysis. The library featured 6 to 9 random nucleotides for both T1 and T2 regions, with the addition of three synthetic base pairs at the Tether-H101 junction (**Fig. 11H**). Selection and analysis were carried out as described above (over four timepoints/days) (**Fig. 11I**). Tether lengths converged to a length of 6 and 8 for T1 and T2, respectively, which the winning sequence being T1: 5' GUUAUA 3' and T2: 5' AUCCCAGG 3' (**Fig. 11K**). *Post-facto* modeling of select highly enriched genotypes as described previously (*Investigation of the Tether-H101 junction*) revealed improved agreeance between constrained and unconstrained conditions compared to our first Broad Sampling library (**Fig. 10E-H and Fig. 11J**).

Clonal isolation of enriched genotypes and test of orthogonal protein synthesis

We then carried out a final round of randomized library building and selection. The goal of this selection was to identify candidates for clonal isolation and characterization of improved genotypes of Ribo-T. The library combined lessons learned from our three previous libraries. First, we tested tether lengths ranging from 5 to 9 nucleotides for T1 and 6 to 9 nucleotides for T2 based on the previous round of Evolink converging to 6 and 8 nucleotides for T1 and T2, respectively (**Fig. 13A**). Second, the library featured a designed Tether-H101 junction, which was reinforced by base pairs that we hoped would contribute to improved structural stability in the tethers. Evolink was carried out to identify enriched pairs of sequences encoding T1 and T2. (**Fig. 8C**). Of the highly enriched genotypes, we sought to more explicitly test if T1 and T2 sequences displayed cooperativity as we had previously observed enrichment of specific combinations between T1 and T2 sequences during evolution (**Fig. 12**).

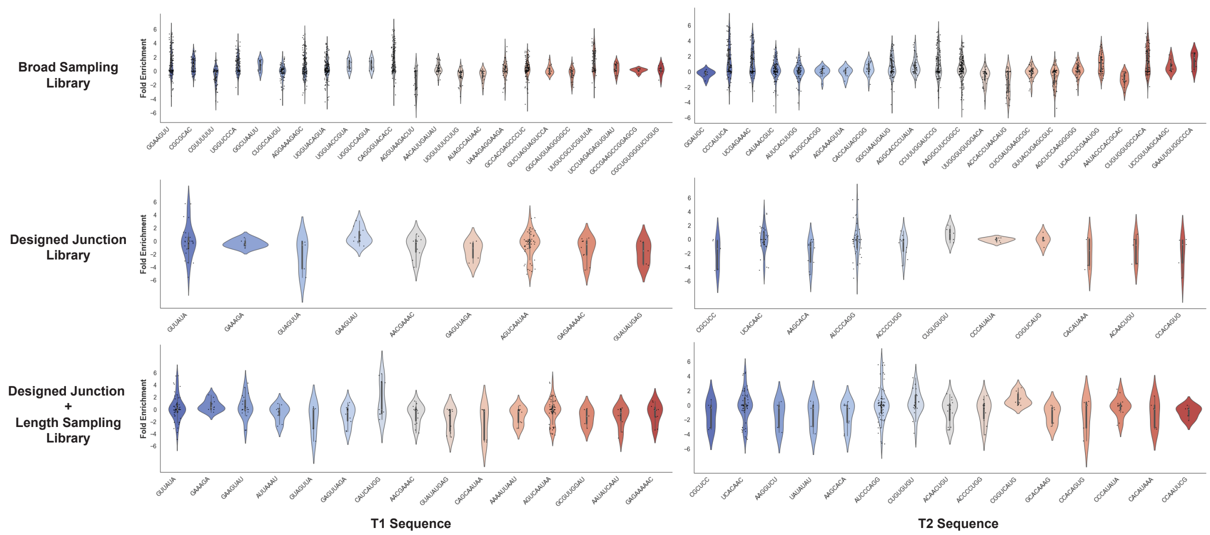

Figure 12. Pairwise interactions between T1 and T2 regions as shown by range of enrichments for popular T1 or T2 sequences. For any given T1 sequence (left), there are a range of enrichment values when paired with different T2 sequences. The same holds true for most popular T2 sequences (right) when paired with various T1 sequences. This is observed over all three libraries (Broad Sampling, Design Junction, and Design Junction + Length Sampling). Enrichment values for all selections range from -6 to 6.

To test this cooperativity hypothesis and isolate a final winning genotype, we built 16 individual genotypes from the final library by combining the top 4 enriched sequences for the T1 and T2 regions from this round of Evolink and tested the combinations individually for their ability to carry out orthogonal GFP synthesis compared to a previously improved tethered ribosome, Ribo-T v2.0 (**Fig. 13B, 13C**). In this assay, the anti-Shin-Dalgarno of the tethered ribosome's small subunits are mutated to selectively translate mRNAs (encoding superfolder GFP) with correspondingly mutated Shine-Dalgarno sequences. The measurement of custom (orthogonal) translation output is a unique application for tethered ribosomes and an important measure of their function. Of the 16 tested genotypes, 14 T1/T2 pairs outperformed Ribo-T v2.0 in orthogonal GFP synthesis, highlighting that our evolutionary strategy had worked to improve tethered ribosome function. Further, we observed combinatorial behavior amongst the 16 individual genotypes tested: as an extreme example, depending on the paired T1, the sequence T2: 5' ACAUAAUG 3' could perform 30% better than oRibo-Tv2 or 30% worse (**Fig. 13C**), supporting the hypothesis that the tethers interact to some degree. The two highest performing tether genotypes were 1) T1: 5' GUUAUA 3' and T2: 5' UCACAAG 3'; and 2) 5' AGUCAAUAA 3' and T2: 5' GACCUUCG 3', which each showed increased orthogonal protein synthesis over Ribo-T v2.0 by 56% and 58%, respectively (**Fig. 13C**). Of these, we chose further characterization for T1: 5' AGUCAAUAA 3' and T2: 5' GACCUUCG 3', which we termed Ribo-T v3. We characterized its function in the Squires strain, where Ribo-T v3 is solely responsible for supporting cellular life. By comparing cells growing on Ribo-T v3 to those supported by Ribo-T v2.0, we looked to measure improvements in the new tethered ribosome in the context of synthesizing a diverse set of protein necessary for cellular survival. The choice of this genotype was based on enrichment trends observed during selection which suggested a length of 8 for T2 was more broadly enriched compared to a T1 length of 6 (**Fig. 12**).

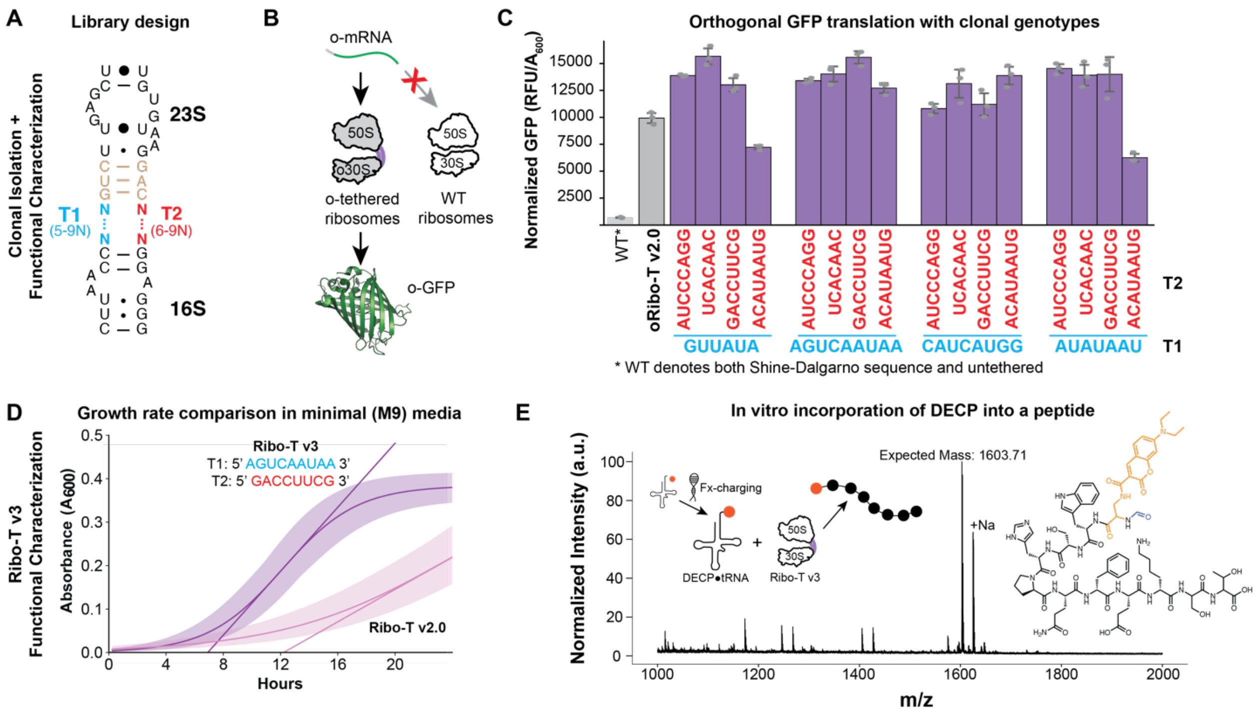

Figure 13. Clonal isolation and test of Ribo-Tv3 function A) The final library which combines the designed Tether-23S junction and lengths informed by Evolink results from the Designed Tether-23S junction library. B) & C) Orthogonal GFP synthesis by 16 candidates Ribo-Tv3 tether pairs based on the four most popular T1 and T2 genotypes. Three biological replicates (n=3) were tested. D) Growth of cells living on Ribo-Tv3 and Ribo-Tv2 on minimal media. Three biological replicates were tested (n=3) and error bars indicate standard deviation. E) Incorporation of 2-amino-3-(7-(diethylamino)-2-oxo-2H-chromene-3-carboxamido) propanoate (DECP) into a sequence-defined peptide by a purified sample of Ribo-Tv3 in an in vitro protein synthesis reaction using flexizymes.

Functional characterization of Ribo-T v3

We tested the ability of Ribo-T v3 to support cellular life in the Squires strain as a general measure of ribosome function [48, 63]. We compared growth rates of cells supported by Ribo-T v3 and Ribo-T v2.0 on both minimal M9 media as well as rich LB-Miller media (**Fig. 13D**). This revealed improved growth characteristics for cells growing on Ribo-T v3 especially in minimal M9 media (**Fig. 13D, Fig. 14**). Notably, although doubling times in LB media were equal within error, cells growing on Ribo-T v3 exhibited a 97% improvement in doubling times in M9 media. Additionally, *E. coli* cells living on Ribo-T v3 exhibited 59% and 77% improvements in lag time for LB and M9 media, respectively. Interestingly, this suggests that differences between Ribo-T v2.0 and Ribo-T v3 extend beyond ribosome function at the molecular scale, but also has implications at the phenotypic level when consideration coordination with other cellular machinery during the process of cellular growth. Considering that evolution for Ribo-T v3 was carried out in LB media, improvements of cellular growth on Ribo-T v3 over Ribo-T v2.0 in minimal M9 media as well as improvements in orthogonal protein yield suggest that evolutionary advantages in fitness can extend to multiple contexts.

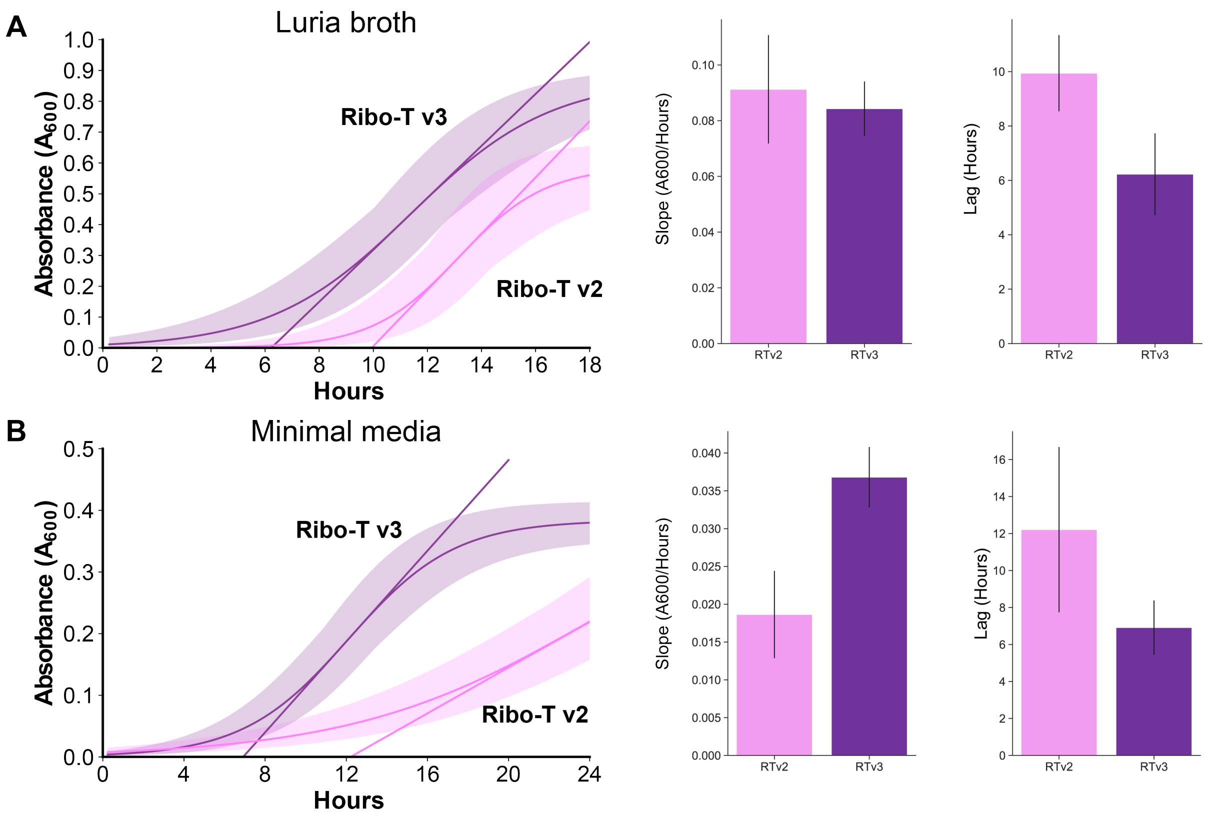

Figure 14. Growth curves and parameters for Ribo-T v3 compared to Ribo-T v2.0 in cells lacking genomic ribosomal operons. Sigmoidal functions were fit to kinetic data (left) to calculate parameters (right). (A) In rich Luria broth (LB), Ribo-T v2 and Ribo-T v3 have equivalent slopes (doubling rates in exponential phase), but Ribo-T v3 has shorter lag time in growth. (B) In minimal M9 media, the difference in slopes and lag are more pronounced. Notably, Ribo-T v2 does not reach full stationary phase in 24 hours while Ribo-T v3 grows to stationary phase between 18-20 hours.

One of the central reasons to develop improved Ribo-T versions is to create specialized, orthogonal tethered ribosome systems that facilitate the translation of new abiological polymers that are otherwise poorly compatible with wild type ribosomes. Towards this vision, we tested the ability of Ribo-T v3 to incorporate a non-canonical amino acid into a peptide. Importantly, the idea was not to engineer Ribo-T v3 to be better than a natural ribosome at incorporating non-canonical amino acids, but rather to show that oRibo-T was compatible with applications geared towards expanding the chemistry of life [13, 19, 49-51, 59]. We chose a nonstandard L-α-amino acid ((R)-2-amino-3-(7-(diethylamino)-2-oxo-2H-chromene-3-carboxamido)propanoic acid, DECP) featuring a diethylamino coumarin group on its sidechain. The monomer, which features a bulky side chain, has not yet been shown to be incorporated into a peptide ribosomally, and thus presented a new and attractive target to showcase Ribo-T v3's ability to expand the chemical biology toolbox of engineered translation machinery. For demonstration purposes we used a cell-free transcription and translation platform based on the PURE system, which we have used before [44-46].

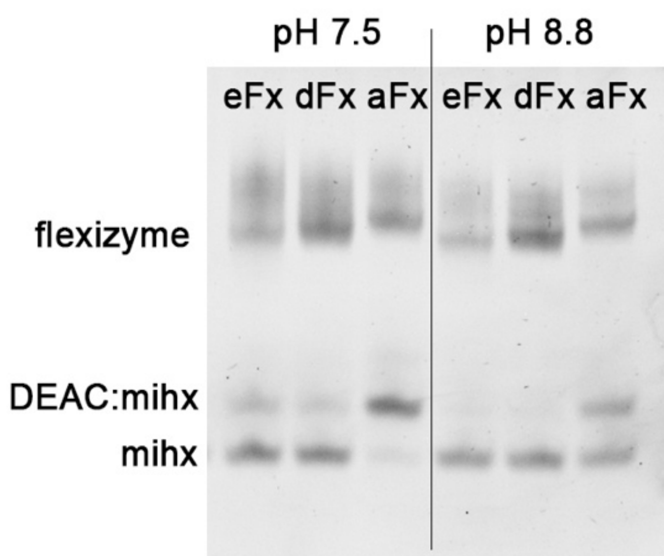

Figure 15. Acylation of microhelix with DECP. The Fx-mediated acylation reaction was monitored using microhelix (a tRNA mimic) under the two different pH (7.5 and 8.8) over 16 h with three

different flxizymes (eFx, dFx, and aFx) at 0° C. The highest acylation yield (86 %) was found when aFx was used in pH 7.5, which was used to charge the substrate into $tRNA^{fMet}$(CAU) and incorporate it into the N-terminus of a peptide *in vitro*.

In this platform, the monomer DECP was charged onto $tRNA^{fMet}$(CAU) using a flexizyme[45] (**Fig. 15**), and added to an *in vitro* translation reaction with a sample of Ribo-T v3 purified from cells (**Fig. 13E**). Mass spectrometry analysis revealed that DECP had been successfully incorporated in the N-terminus of a peptide by Ribo-T v3 (**Fig. 13E, Fig. 18**). Of note, the wild-type ribosome was also capable of incorporation of this monomer into a peptide, but our focus was to show that the tethered ribosome, which stands to be more friendly to engineering, is also capable of incorporation of novel monomers. To our knowledge, this is the first demonstration of a tethered ribosome incorporating a non-canonical amino acid *in vitro*, while also demonstrating cooperativity with other synthetic translation machinery such as flexizymes and *in vitro*-synthesized aminoacyl-tRNAs.

Discussion

In this work, we present an improved tethered ribosome platform, termed Ribo-T v3, evolved from the previous state-of-the-art version of the tethered ribosome (Ribo-T v2.0). Key to our effort was the development of Evolink (Evolution and linkage), a technique for evolving regions in macromolecular machines that are far apart in primary sequence but proximal (and potentially functionally linked) in three-dimensional space. Evolink utilizes readily available molecular biology procedures (PCR and ligation) to link together distal sites of a plasmid in a single next-generation sequencing (NGS) read, alleviating previous limitations set forth by short NGS read lengths (~300 nucleotides). We applied four iterations of our design-build-test-analyze (DBTA) cycle, which featured libary designs informed by next-generation sequencing results as well as structural modeling, to develop Ribo-T v3. Libraries explored simultaneous variation of tether sequence and length, as well as assessing the sensitivity of tethered ribosome function on the Tether-H101 junction.

Ribo-T v3 features new tether RNA sequences (T1:5' AGUCAAUAA 3' and T2: 5' GACCUUCG 3') as well as designed base pairs at the Tether-H101 junction. Ribo-T v3 exhibits up to an 58% improvement in orthogonal protein translation and a 97% improvement in growth rate as well as a 77% improvement in lag time (in SQ171 cells) in M9 minimal media. Interestingly, cells supported by Ribo-T v3 in rich LB-Miller media exhibit comparable growth rates to those living on Ribo-T v2.0, but a 59% improvement in lag time, demonstrating phenotypic differences behind cells supported by tethered ribosomes beyond doubling time. Additionally, we showcase Ribo-T v3's potential for expanding the chemical toolbox of orthogonal translation systems through the incorporation of a new non-canonical amino acid featuring a bulky side chain into a peptide using an in vitro transcription and translation reaction using flexizymes. We suspect that the improved function of Ribo-T v3 over Ribo-T v2.0 may stem from improved functions on multiple fronts, such as 1) improved assembly and post-transcriptional modifications[73], 2) improved translation initiation, elongation, and termination, and may bestow upon Ribo-T v3 greater amenability for future engineering.

Evolink and improved tethered ribosomes lay the foundation for future efforts in synthetic biology to expand the palette of genetically encoded chemistries. Previous work showed that engineering the active site of the ribosome permits incorporation of amino acid stretches that stall translation[59, 63], backbone-extended monomers[19, 50, 51], and mirror-image amino acids[13, 49]; each of these important goals may benefit from starting from Ribo-T v3. We predict that Evolink will accelerate the already exciting progress in orthogonal translation machinery[26, 48, 59, 61] to allow coordinated evolution of multiple translation machines, which work collectively to enable sequence-defined polymerization. Evolink is machine-agnostic and can be applied broadly to, for example, understanding epistasis across the translation apparatus as well as biophysical modeling of the consequences of newly uncovered interactions. Moving forward, we hope that both the directed evolution approach presented here and the resulting improved tethered ribosome (Ribo-T v3) will contribute meaningfully to help accelerate progress in the scientific community.

Materials and Methods

Library construction

Plasmid libraries of Ribo-T tethers were generated using polymerase chain reaction (PCR) with the plasmid encoding Ribo-T v2.0 [48], as the template. Oligonucleotides (IDT, USA) encoding degenerate bases (Ns) in place of the tethers were used to amplify the insert which includes both tethers and the 23S rRNA (referred to as the insert) (**Fig. 5C**). For the Tether-23S junction, oligos encoded deletions in the specified region, not degenerate bases (**Fig 11B**). Another pair of oligos amplified the remainder of the plasmid (referred to as the backbone). Resulting amplicons were purified using the Omega Cycle-Pure kit (Omega Bio-Tek), then digested with DpnI (NEB) to remove the template. The insert and backbone were ligated using isothermal DNA assembly[70], and transformed into POP2136 cells via electroporation. Post-transformation, the cells were recovered in 800 µL of SOC at 30 °C for 90-120 minutes, then plated on LB-agar plates containing 100 µg/mL carbenicillin. The plates were incubated at 30 °C for 16-18 h until colonies appeared. All colonies were scraped from the agar plates and plasmid extraction was performed using a Zymo-PURE Midiprep II kit (Zymo Research).

Table 1. Primers used for library construction, Broad Sampling Library

Primer Name	Sequence (5’ → 3’)	Description
RTv3_BroadSample_5N-f	AAGAAGTAGGTAGCTTAACCnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 5 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_5N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 5 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_6N-f	AAGAAGTAGGTAGCTTAACCnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 6 degenerate nucleotides in T1 region, Broad Sampling Library

RTv3_BroadSample_6N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 6 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_7N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 7 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_7N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 7 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_8N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 8 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_8N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 8 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_9N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 9 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_9N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 9 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_10N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 10 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_10N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 10 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_11N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 11 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_11N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 11 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_12N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 12 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_12N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 12 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_13N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 13 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_13N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 13 degenerate nucleotides in T2 region, Broad Sampling Library
RTv3_BroadSample_14N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 14 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_14N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 14 degenerate nucleotides in T2 region, Broad Sampling Library

RTv3_BroadSample_15N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnnnnnnnTTGAGCTAACCGGTACTAATGAACC	Forward primer used to install 15 degenerate nucleotides in T1 region, Broad Sampling Library
RTv3_BroadSample_15N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnnnnnnCTTACACACCCGGCCTATCAA	Reverse primer used to install 15 degenerate nucleotides in T2 region, Broad Sampling Library

Table 2. Primers used for library construction, Tether-H101 Junction Library

Primer Name	Sequence (5' → 3')	Description
d1_RTv2-f	GAAGTAGGTAGCTTAACCcaatgaacaattggaGCGTTGAGCTAACCGGTACTAATGAAC	Forward primer for 1 residue deletion in Tether-H101 junction
d1_RTv2-r	AATCACAAAGTGGTAAGCGCCCTCCactagttatcGCGCTTACACACCCGGCCTATCAA	Reverse primer for 1 residue deletion in Tether-H101 junction
d2_RTv2-f	GAAGTAGGTAGCTTAACCcaatgaacaattggaCGTTGAGCTAACCGGTACTAATGAACC	Forward primer for 2 residue deletion in Tether-H101 junction
d2_RTv2-r	AATCACAAAGTGGTAAGCGCCCTCCactagttatcCGCTTACACACCCGGCCTATCAA	Reverse primer for 2 residue deletion in Tether-H101 junction
d3_RTv2-f	GAAGTAGGTAGCTTAACCcaatgaacaattggaGTTGAGCTAACCGGTACTAATGAACC	Forward primer for 3 residue deletion in Tether-H101 junction
d3_RTv2-f	AATCACAAAGTGGTAAGCGCCCTCCactagttatcGCTTACACACCCGGCCTATCAA	Reverse primer for 3 residue deletion in Tether-H101 junction
d4_RTv2-f	AAGAAGTAGGTAGCTTAACCcaatgaacaattggaTTGAGCTAACCGGTACTAATGAACC	Forward primer for 4 residue deletion in Tether-H101 junction
d4_RTv2-r	AATCACAAAGTGGTAAGCGCCCTCCac tagttatcCTTACACACCCGGCCTATCA	Reverse primer for 4 residue deletion in Tether-H101 junction
d5_RTv2-f	AAGAAGTAGGTAGCTTAACCcaatgaacaattggaTGAGCTAACCGGTACTAATGAACC	Forward primer for 5 residue deletion in Tether-H101 junction
d5_RTv2-r	AATCACAAAGTGGTAAGCGCCCTCCactagttatcTTACACACCCGGCCTATCAA	Reverse primer for 5 residue deletion in Tether-H101 junction

Table 3. Primers used for library construction, designed junction library

Primer Name	Sequence (5' → 3')	Description
RTv3_Designed Junc_5N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnGCCTTACACACCCGGCCTATCAA	Forward primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_5N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnGTCCTTACACACCCGGCCTATCAA	Reverse primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_6N-f	AAGAAGTAGGTAGCTTAACCnnnnnnGCTTGAGCTAACCGGTACTAATGAACC	Forward primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_6N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnGCCTTACACACCCGGCCTATCAA	Reverse primer for 5 degenerate residues for Designed Junction Library

RTv3_Designed Junc_7N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnGCTTGAGCTAACCGGTACTAATGAACC	Forward primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_7N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnGCCTTACACACCCGGCCTATCAA	Reverse primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_8N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnGCTTGAGCTAACCGGTACTAATGAACC	Forward primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_8N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnGCCTTACACACCCGGCCTATCAA	Reverse primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_9N-f	AAGAAGTAGGTAGCTTAACCnnnnnnnnnGCTTGAGCTAACCGGTACTAATGAACC	Forward primer for 5 degenerate residues for Designed Junction Library
RTv3_Designed Junc_9N-r	AATCACAAAGTGGTAAGCGCCCTCCnnnnnnnnnGCCTTACACACCCGGCCTATCAA	Reverse primer for 5 degenerate residues for Designed Junction Library

Table 4. Primers used for library construction, backbone of tethered ribosome plasmid

Primer Name	Sequence (5' → 3')	Description
Ribo-T_bb-f	GGAGGGCGCTTACCACTTTGTGATT	Forward primer for amplification of backbone with library inserts made in Tables 1 and 2, assemble by isothermal assembly
Ribo-T _bb-r	GGTTAAGCTACCTACTTCTTTTGCA	Reverse primer for amplification of backbone with library inserts made in Tables 1 and 2, assemble by isothermal assembly

Selection of tethered ribosomes

The libraries of Ribo-T tethers were transformed into SQ171 cells lacking chromosomal ribosomes[30]. 100 ng of the plasmid library was transformed into 50 μL of SQ171fg cells via electroporation, then recovered with 500 μL SOC at 37 °C with shaking at 250 rpm for 2 h. After, another 1.5 mL of SOC was added to the cells and the final 2 ml culture was brought to 100 μg/mL carbenicillin and 0.25% sucrose. These cells were then incubated at 37 °C with shaking at 250 rpm for 16-18 h. After incubation, cells were plated onto LB-agar plates containing: carbenicillin (100 μg/mL), sucrose (5% w/v), and erythromycin (250 μg/mL) and incubated at 37 °C for 20-24 h until colonies appeared. Colonies were then washed from the agar plates with LB containing 100 μg/mL carbenicillin (~5 mL of LB-carbenicillin per 100 mm petri dish) and grown to saturation at 37 °C with 250 rpm shaking. 1 mL of the solution was reserved and plasmids were extracted using the Zymo-PURE Miniprep kit (Zymo Research). The saturated culture was then subject to passaging over 4 days in LB containing 100 μg/mL carbenicillin, and plasmids were extracted each day for sequencing.

Preparation of amplicons for next-generation sequencing

Plasmids extracted from selection cultures were linearized using PCR, and purified using the Omega Cycle-Pure kit. 20 ng of the purified product was then used in a 20 mL ligation reaction containing T4 ligase (NEB) and the appropriate accompanying buffer. After incubation at 37 °C for 2 h, 2 μL of the ligation reaction was used directly in a 20 μL PCR with 15 cycles of amplification, which generated the amplicon for next-generation sequencing. The resulting product was then purified and prepared for next-generation sequencing using the NEBNext Ultra II DNA Library Prep kit (NEB). The resulting library was run on a MiSeq (Illumina) using a 150-cycle MiSeq Reagent Kit v3 (Illumina).

Analysis of next-generation sequencing results

Paired end reads from Illumina sequencing were assembled using PANDASeq[74]. Reads that had coverage (number of redundant reads) of less than ten were filtered and excluded from analysis. Pairs of sequences were then identified, and the following parameters were calculated.

Abundance was calculated using the following formula:

$$Abundance_{i,n} = \frac{reads_{i,n}}{\sum_i^S reads_{i,n}}$$

for a specific genotype *i* at timepoint *n*, and *S* represents the total number of unique genotypes at timepoint *n* after filtering as described above.

Fold-enrichment was calculated using the following formula:

$$Enrichment_{i,n} = log_2 \frac{abundance_{i,n}}{abundancei,_0}$$

for a specific genotype *i* at timepoint *n*, and abundance$_0$ represents the abundance after selection on agar plates as previously described before any liquid culture.

Post facto computational modeling of tether structure

To conduct these simulations, we set up FARFAR2 simulations[72] using a crystal structure of the *E. coli* ribosome[75] (PDB code: 4YBB). Starting from that structure, we truncated the stem-loops 23S rRNA Helix 101 (H101) and 16S rRNA helix 44 (h44), removing the residues that are deleted in all tethered ribosome constructs, and renumbered those residues to facilitate building a continuous RNA chain.

Using that initial structure as a template, we built the remaining residues of the tether using the FARFAR2 algorithm, conducted on 200 CPUs for 24 h, generating several thousand structures.

We conducted simulations under two conditions: in one, only tether residues were resampled; in another, a junction on the 23S side of the tether was resampled as well.

All inputs and command files used in setting up computational modeling are available at https://github.com/everyday847/ribotv3_simulations

Measurement of orthogonal GFP production

Combinations of potentially high-performant tether designs were identified from next-generation sequencing results and built into a plasmid containing both an orthogonal tethered ribosome gene (oRibo-T) and an orthogonal superfolder GFP (o-sfGFP) coding sequence (mutated Shine-Dalgarno sequence)[48]. 10 ng of sequence-confirmed plasmids were then transformed into 25 μL of BL21(DE3) cells via electroporation, recovered in 1 mL of SOC, and plated on agar plates containing 100 μg/mL of carbenicillin. Individual colonies were picked (n=3) for inoculation of 100 μL of LB media containing 100 μg/mL carbenicillin. Cultures were incubated at 37 °C for 14-16 h with 2 mm continuous linear shaking in a plate reader (Agilent BioTek Synergy H1) and absorbance at 600 nm (OD_{600}) was monitored to ensure saturation. After cultures reached saturation, each culture was diluted to an of ~0.01 OD_{600} in fresh LB media containing 100 μg/mL of carbenicillin and 1 mM isopropyl β-D-1-thiogalactopyranoside (IPTG) to induce transcription of the orthogonal GFP gene. Cultured were incubated at 37 °C for 14-16 h with 2 mm continuous linear shaking in a plate reader and OD_{600} was monitored along with fluorescence (485/528 nm excitation/emission). Orthogonal GFP production (fluorescence) was normalized by OD_{600}.

Growth rate characterization of Ribo-Tv3

A plasmid encoding tether sequences corresponding to Ribo-Tv3 (named pRTv3), was constructed using Gibson assembly[70]. 10 ng of pRTv3 was transformed into 50 µL of SQ171fg cells [63] via electroporation and recovered in 500 µL of SOC at 37 °C for 2 h with shaking at 250 rpm. After recovery, 1.5 mL of SOC was added and supplemented with 100 µg/mL carbenicillin and 0.25% (w/v) sucrose (final concentrations). After overnight (16-18 h) recovery at 37 °C with 250 rpm shaking, the cells were spun down (4000 xg, 10 minutes) and plated on LB-agar plates containing 100 mg/m: carbenicillin, 5% sucrose, and 250 µg/mL erythromycin. Individual colonies were picked, and resistance to 100 µg/mL carbenicillin and sensitivity to 50 µg/mL kanamycin was checked on LB-agar plates to confirm successful swapping of ribosome plasmids in the SQ171 cells. Colonies that successfully replaced pCSacB [30] with pRTv3 were carried through for analysis.

In a 96 well plate, 100 µL of LB media containing 100 µg/mL carbenicillin, 5% sucrose, and 250 µg/mL erythromycin was inoculated with a colony from an LB agar plate containing 100 µg/mL carbenicillin, 5% sucrose, and 250 µg/mL erythromycin and incubated for 14-16 h at 37 °C with 2 mm lateral shaking in a plate reader (Agilent BioTek Synergy H1). Absorbance at 600 nm was monitored to ensure cultured reached saturation. After incubation, cultured were diluted to A_{600} ~0.05 (~20-fold) in 100 µL of LB media containing 100 µg/mL carbenicillin, 5% sucrose, and 250 µg/mL erythromycin and incubated for 18 h at 37 °C with 2 mm lateral shaking, and absorbance at 600 nm (A_{600}) was monitored.

Preparation of DECP-CME

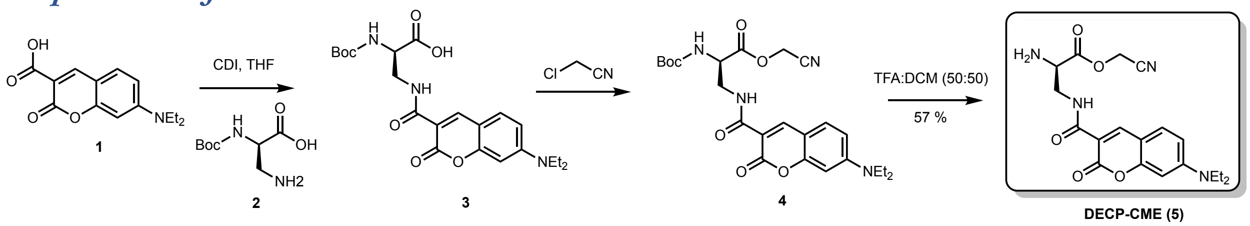

Figure 16. Synthesis route for Cyanomethyl-2-amino-3-(7-(diethylamino)-2-oxo-2H-chromene-3-carboxamido) propanoate

Cyanomethyl-2-amino-3-(7-(diethylamino)-2-oxo-2H-chromene-3-carboxamido) propanoate (DECP-CME, 5) was prepared with three steps using the synthetic methods previously described [45, 76]. 1) 268 mg (1 mmol) of 7-(diethylamino)-2-oxo-2H-chromene-3-carboxylic acid (1) and 162 mg (1 mmol) of carbonyldiimidazole (CDI) were added to a flask and sealed with a septum. 5 mL of anhydrous DMF was added into the flask using an oven-dried syringe and stirred at room temperature for 2 h. 204 mg (1 mmol) of (R)-3-amino-2-((tert-butoxycarbonyl)amino)propanoic acid (2) was added and stirred overnight. The product was extracted with ethyl acetate after washing the crude reaction mixture with 1 M HCl, water, and brine. 2) 38 mL (0.6 mmol) of chloroacetonitrile and 104 mL (0.75 mmol) of triethylamine were added to 223 mg (0.5 mmol) of the purified 2-((tert-butoxycarbonyl)amino)-3-(7-(diethylamino)-2-oxo-2H-chromene-3-carboxamido) propanoic acid (3) in 1 mL of DCM and stirred overnight. The organic layer was washed with 1 M HCl, water, and brine and dried over $MgSO_4$. 3) 1 mL of 50 % of TFA solution in DCM was added to the purified cyanomethyl 2-((tert-butoxycarbonyl)amino)-3-(7-(diethylamino)-2-oxo-2H-chromene-3-carboxamido)propanoate (4) to deprotect the Boc group. The final product was dried under high vacuum and obtained as pale yellow powder (yield: 57 %).

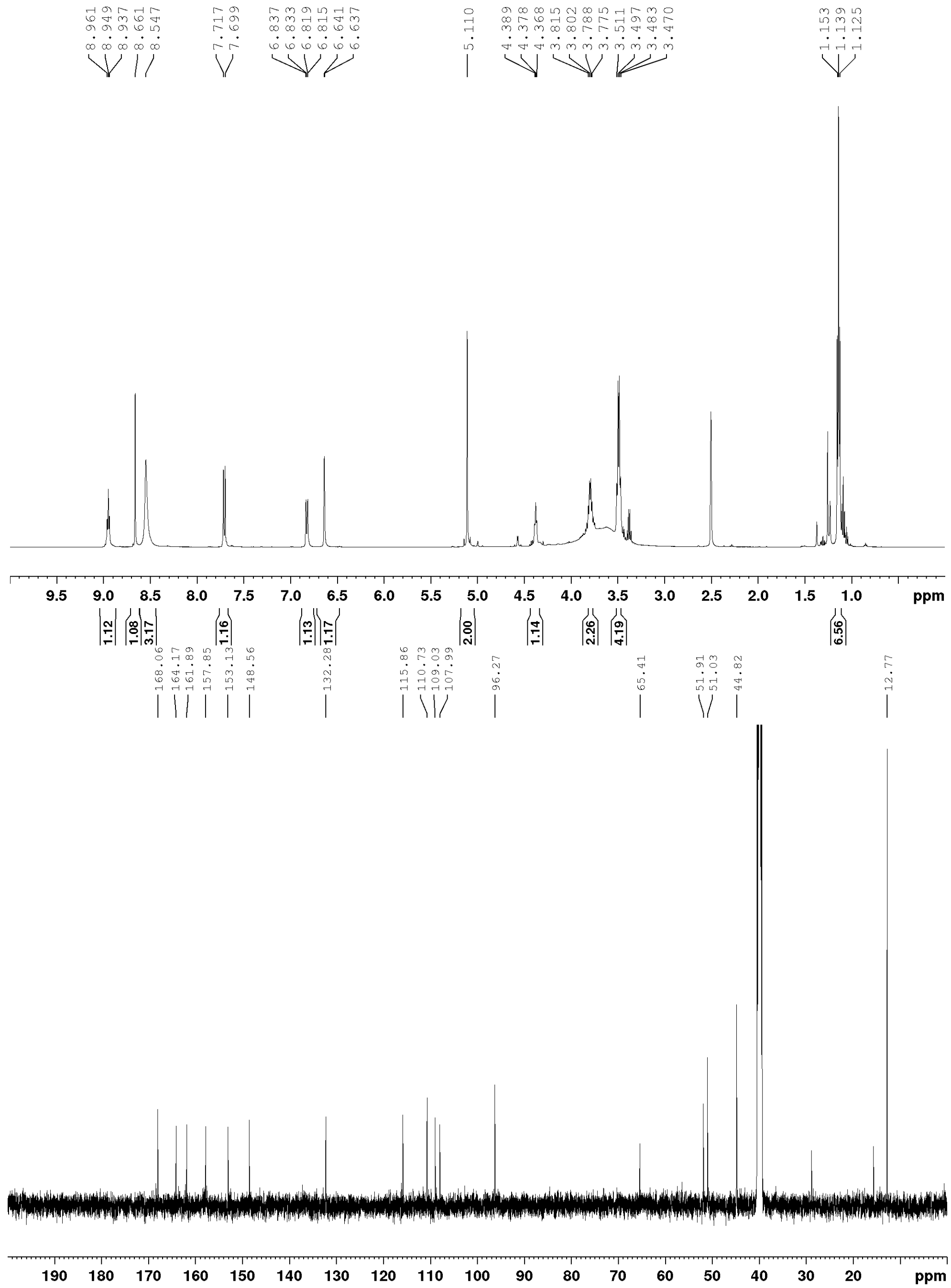

Figure 17. ^{1}H and ^{13}C NMR spectra of DECP-CME (5).

Purification of RTv3 for in vitro translation reactions

In brief, SQ171fg harboring pRTv3 as the sole source of ribosomes were grown to mid-exponential phase (0.3-0.8 A_{600}) in 500 mL of LB media containing 100 μg/mL carbenicillin and 250 μg/mL erythromycin. Cells were spun down, lysed using homogenization, and ribosomes were harvested using a sucrose cushion as described previously [33]. Ribosome pellets were resuspended in Buffer C (10 mM pH 7.5 Tris Acetate, 60 mM ammonium chloride, 7.5 mM magnesium acetate, 0.5 mM ethylenediaminetetraacetic acid, and 2 mM dithiothreitol) and brought to a concentration of 15 mM (A_{260} = 625). Resuspended ribosomes were used directly in in vitro translation reactions.

In vitro translation reactions for incorporation of nonstandard monomers by RTv3

Preparation of DNA templates for RNAs. The DNA templates for flexizmyes and tRNAs preparation were synthesized as previously described [43, 45]. Sequences of the final DNA templated used for *in vitro* transcription by the T7 polymerase are:

Table 5. DNA templates used for *in vitro* transcription

fMet (CAU)	5' GTAATACGACTCACTATAGGCGGGGTGGAGCAGCCTGGTAGCTCGTCGGGCTCATAACCCGAAGATCGTCGGTTCAAATCCGGCCCCCGCAACCA 3'
eFx	5' GTAATACGACTCACTATAGGATCGAAAGATTTCCGCGGCCCCGAAAGGGGATTAGCGTTAGGT 3'
dFx	5' GTAATACGACTCACTATAGGATCGAAAGATTTCCGCATCCCCGAAAGGGTACATGGCGTTAGGT 3'
aFx	5' GTAATACGACTCACTATAGGATCGAAAGATTTCCGCACCCCCGAAAGGGGTAAGTGGCGTTAGGT 3'

Underline denotes the T7 promoter sequence

Preparation of Fxs and tRNAs

Flexizymes (Fxs) and tRNAs were prepared using an *in vitro* transcription kit (HiScribe™ T7 High yield RNA synthesis kit, NEB E2040S) and purified by the previously reported methods [43].

Charging DECP into tRNA by Fx

The acylation experiment was performed first using flexizyme with three flexizymes (e, d, and aFx). The Fx reaction was carried out as follows: 1 μL of 0.5 M HEPES (pH 7.5) or bicine (pH 8.8), 1 μL of 10 μM microhelix (mihx, tRNA mimic), and 3 μL of nuclease-free water were mixed in a PCR tube with 1 μL of 10 μM eFx, dFx, and aFx, respectively. The mixture was heated for 2 min at 95 °C and cooled down to room temperature over 5 min. 2 μL of 0.3 M $MgCl_2$ in water was added to the mixture and incubated for 5 min at room temperature. Followed by the incubation of the reaction mixture on ice for 2 min, 2 μL of 25 mM DECP-CME in DMSO was then added to the reaction mixture. The reaction mixture was incubated for 16 h on ice in cold room. The optimal acylation reaction was determined by measuring the acylation yield using an acidic polyacrylamide gel (pH 5.2). $tRNA^{fMet}$(AUG) was charged with DECP under the condition obtained from the mihx acylation experiment. The charged tRNA was precipitated by ethanol and used for *in vitro* translation without further purification.

In vitro protein translation reaction

The non-canonical substrate incorporation experiment was performed using the PURExpress™ (Δaa, ΔtRNA, E6840) system. DECP-charged $tRNA^{fMet}$(CAU) was dissolved in 1 μL of 1 mM NaOAc (pH 5.2) and added into 9 μL solution mixture containing 2 μL of Solution A, 3 μL of Solution B, 1 μL of endogenous tRNA mixture, 1 μL of DNA plasmid (130 ng μL^{-1}), 1 μL of nuclease-free water, and 1 μL of 5 mM amino acid mixtures (Trp, Ser, His, Pro, Gln, Phe, Glu, Lys, and Thr). The reaction mixture was incubated in 37°C for 2 h.

The target peptide produced in the PURE reaction was purified by using MagStrep (type 3) XT beads 5 % suspension (IBA Lifesciences) which selectively pull down the target peptide bearing the Strep tag (WSHPQFEK) at the C-terminal region. After pulling down the target peptide, the magnetic beads were washed with the Strep-Tactin XT wash buffer (IBA Lifesciences) and treated with 0.1 % SDS solution. The beads were heated at 95 °C in a PCR machine to denature the target peptide bound to the beads. The magnetic beads were removed on a magnet rack and the obtained peptide was analyzed by mass spectrometry.

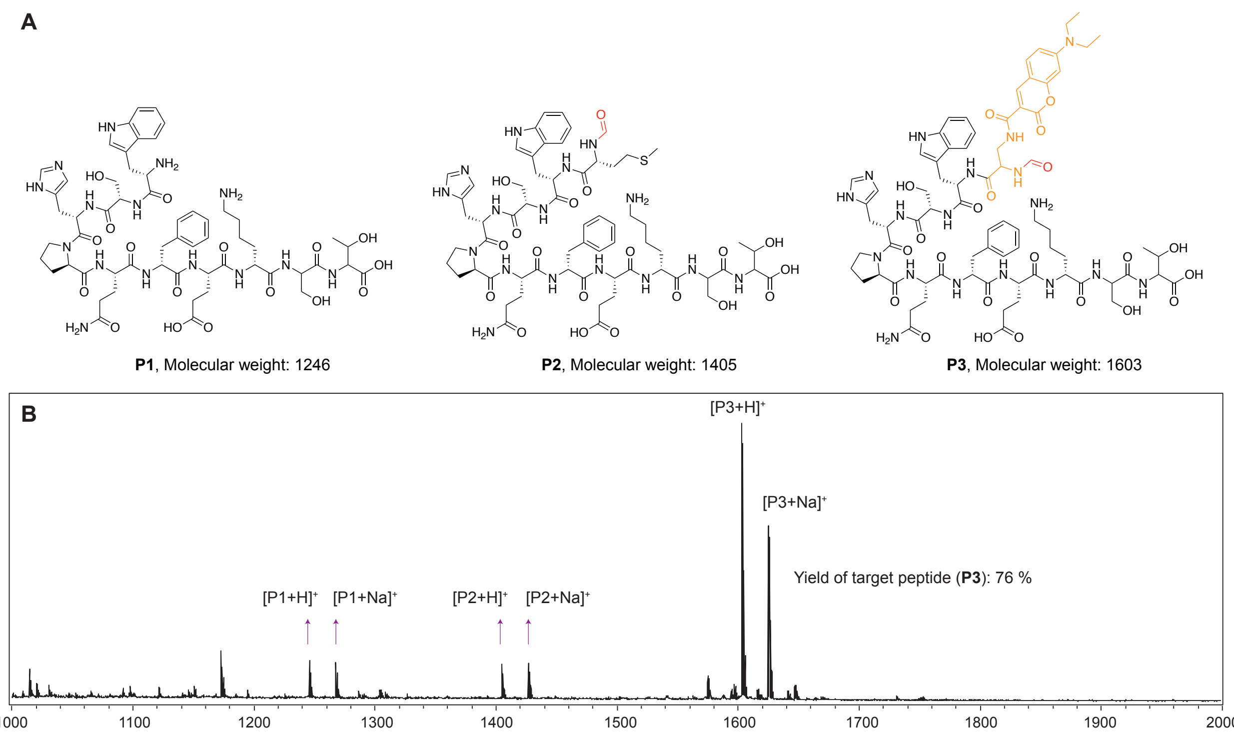

Figure 18. Characterization of N-terminus functionalized peptide hybridized with DECP. A) Structure and molecular weight of byproduct peptides in the *in vitro* translation reaction that are produced. B) MALDI mass spectrometry data (**Fig. 13E**) obtained from attempt to incorporate DECP with Ribo-T v3. The truncated peptide (**P1**) was produced likely because Ribo-T v3 skipped the incorporation of DECP at the initiating codon (AUG) on mRNA. **P2** was produced presumably because of the contaminations of either amino acid or fMet-charged tRNA ($tRNA^{fMet}$) when Ribo-T

v3 obtained from *E. coli* cell was supplemented into the *in vitro* translation reaction. The percent yield (76 %) of the target peptide (**P3**) was determined based on the relative peak area (PA) of **P3** over a total amount of the byproducts (**P1** and **P2**) and **P3** (i.e., relative yield (%) = Σ of PA (**P3**) / Σ of PA (**P1** + **P2** + **P3**) × 100).

Author Contributions

Do Soon Kim (D.S.K)., Michael C. Jewett (M.C.J)., Andrew Watkins (A.W.M.), and Rhiju Das (R.D.) conceived the study and designed experiments. D.S.K., Erik Bidstrup (E.J.B.), Emily Roney (E.R.), and Camila Kofman (C.K.) worked on establishing the Evolink method. D.S.K. and E.J.B. carried out experiments for tethered ribosome evolution, orthogonal GFP expression, and growth rate assays. D.S.K. and A.M.W. analyzed results and designed the libraries. A.M.W. carried out computational modeling. D.S.K., A.M.W., M.C.J., and R.D. wrote the manuscript with participation by all authors.

Towards Minimal Ribosomes

Foreword: Why minimize the ribosome?

My first two years of graduate school were spent in failure. In the beginning, I worked to evolve the active site of Ribo-T towards new functions, including decoding of quadruplet codons, which had in principle been shown to work in published literature[21]. I spent a considerable amount of time trying to replicate published results to no avail, and library after library, selection after selection turned up nothing but the wild type sequence, falling victim to the evolutionary valley, which turned out to be a lot deeper than I had expected at the onset.

So how does a chemical engineer, deep in the pit of despair, turn to minimizing the ribosome? I realized in my failures to reproduce published research that I was spending a tremendous amount of time trying to replicate something that had either already been done, or likely had some amount of secret magic sauce that I would never be privy to. In all of my libraries that I had built, I had gone back and randomized slightly different nucleotides each time, without much guidance outside of the existence of a single high-resolution structure of the ribosome captured with a substrate of interest, whether it be a release factor, elongation factor, synthetase, or tRNA. I spent a lot of time looking at the peptidyl transferase center, and not much else. It was around this time that I spent a considerable amount of time staring at the high-resolution structure of the apo-ribosome, purely as a machine, with no other substrates. Eventually, I turned to viewing the ribosome as not this magical yarn ball of catalytic RNA, but more agnostically, as a complex multi-component machine. And like any engineer, I knew that the best way to understand how this machine worked would be to take it apart.

Around the same time, I started wondering if there was a fundamental limit to the size of monomer that the ribosome is able to accommodate, which, for a monomer, would be the A-site and P-site, followed by the exit tunnel. ribosome's exit tunnel, ribosomal proteins L4 and L22 come together to form the narrowest part of the tunnel[77], which to me seemed like the physical limit of the size of monomer that would be permitted for polymerization in the ribosome. I knew that mitochondrial ribosomes had a vastly different exit tunnel, and overall an incredibly different makeup of RNA to proteins, so I knew alternative architectures in the ribosome's exit tunnel were possible. So I started digging much like a puppy in a garden would, starting with the opening of the exit tunnel to the solvent near Helix 24. I still remember my first naïve deletion: Residues 476-509 in Helix 24, replaced with a poly A linker. Later that week, Jack Szostak came by Northwestern around that time and gave a fantastic talk on the origin of life, and I was off to the races. In many ways, I learned almost all that I know about the ribosome reading papers so I can figure out what parts were actually necessary, with plans to rip everything else out.

Like with all ambitious scientific projects, I soon hit a wall, then a series of walls that required many pivots. We soon reached out to Rhiju Das, who brought on a team of brilliant graduate students and postdocs, hosted me in his lab to become familiar with their computational pipelines for RNA structure prediction, and introduced me to a way of looking at the ribosome with fluency I didn't possess previously to the collaboration. We were soon able to apply computational design to the deletions being designed, and we were off to the races.

In my third year of graduate school, after I had passed my qualifying exam, I finally came up with what I felt like was an original project. To be frank, this project hasn't been easy and has been met with more challenges than I could have ever imagined, but it has taught me invaluable lessons about science and the importance of keeping my eye on the prize. Although I only had time for what can be described as a proof of concept study, I am particularly excited for the potential of this project as others explore this topic further to radically engineer the ribosome.

Abstract

The ribosome is one of nature's most prolific molecular machines. Efforts to engineer the ribosome to repurpose its powerful polymerization function or to deepen our understanding of macromolecular machines is often hindered by its structural and sequence complexity. Towards this, we present our effort to minimize the bacterial ribosome through deletions in the 23S rRNA. By leveraging computational analysis of tertiary and secondary structure, high throughput experimentation, and *de novo* computational design, we evaluated 215 deletions in every Domain of the 23S rRNA of the *Escherichia coli* ribosome, and measured the impact of each deletion on ribosome assembly and function. We identified over 50 successful deletions, including a 113-nucleotide deletion in Domain I of the 23S rRNA. Additionally, we show, as proof of concept, that three-dimensional RNA design algorithms can be applied to optimize deletion designs, and that individual deletions can be combined, charting a path towards minimization of the ribosome. Taken together, we hope our findings will lead the way towards extensive minimization of the ribosome, yielding insights in fundamental and synthetic biology in areas as diverse as the origin of life and repurposing the translation apparatus towards new abiological chemistries.

Introduction

The bacterial ribosome has emerged as an attractive target for engineering, and recent advances have accelerated the possibilities in this exciting field. Engineering the ribosome has benefits in both the fundamental and applied sciences, efforts in this realm can help elucidate the design rules behind molecular translation, and in parallel can help create new RNA enzymes that can unlock genetically encoded chemistries with applications in materials, energy, and medicine[62]. However, a longstanding challenge in ribosome engineering is the complexity and size of the ribosome, a 2.5 MDa ribonucleoprotein machine made of three RNAs (16S, 23S, and 5S rRNAs) and 54 proteins (r-proteins)[75]. Compounding the challenges of ribosome engineering are the ribosome's central role in upkeeping cellular life as well as the tightly controlled process of ribosome biogenesis, which often prohibit extensive engineering in cells. Thus, methods common to other protein-based machines are not easily applied to engineering the ribosome, and although variant ribosomes have been reported and hold promise for exciting new advances, much of the work remains limited by our inability to radically redesign and reshape the ribosome for new functions.

Underlying the "uphill battle" to ribosome engineering is that the ribosome has been extensively optimized in evolution for structure and function. Segments of the rRNAs and r-proteins are amongst the most conserved across all of life[78], and the core architecture of the ribosome as a machine is conserved across all domains of life. However, the structures of mitochondrial ribosomes suggest that alternative architectures of ribosomes are possible[79-81], although to which extent this is not known. Because ribosome architectures and sequences are so heavily conserved, it becomes hard to predict *de novo* what parts of the ribosome should be engineered for new functions such as tolerance for backbone modified amino acids and new polymerization chemistries. One promising solution to escaping the evolutionary constraints placed on the ribosome is through minimization, and several previous works have hypothesized about this possibility[82, 83]. To our knowledge, there does not exist previous work on systematic minimization of the ribosome, which stands to unlock a powerful route to escape the evolutionary trap and enable radical engineering of the ribosome. There exist some hints in the literature that this is possible, including works outlining a possible sequence space for the minimal ribosome, and two studies that look at deletions in the sarcin-ricin loop [84] and Helix 69 of the 23s rRNA [85] to assess its impact on ribosome function. Advancements in platforms for ribosome engineering now allow for systematic testing of many ribosomal variants[26, 30, 33], including a platform for one-pot synthesis of ribosomal RNA, assembly with ribosomal proteins into functional ribosomes, followed by testing of their functions through the translation of a reporter protein.

Here, we present our progress on designing and testing minimal ribosomes. We leverage advancements in our understanding of ribosome structure as well as the invention of experimental platforms for synthesizing modified ribosomes to design and test over 200 ribosome variants featuring deletions in the ribosomal 23S rRNA. We then apply algorithms for computational structure prediction towards *de novo* design of minimized ribosomes to rescue and improve their activities. Finally, we present strategies for combining individual, permissible deletions in the 23S rRNA to iteratively minimize the ribosome further, and show experimental validation of 31 different combinations as a proof of concept. Taken together, we expect our work to serve as a starting point towards a new era in ribosome engineering, where advancements in ribosome design, building, and testing platforms can be leveraged to accelerate our progress towards engineered molecular machines as well as insights about the origin of life.

Results

Identification and classification of apical stem-loops for deletions

As a first pass, we wanted to identify regions of the 23S rRNA that were permissible for deletion as a path towards ribosome minimization. Given that the 23S rRNA of the *E. coli* ribosome is 2904 residues long and there exists over 4 million possibilities for a deletion of a stretch rRNAs, we sought a method to identify, classify, and narrow down candidates for deletion based on an objective metric that was not subject to human bias. To achieve this, we started by identifying the number of tertiary contacts per residue in the 23S rRNA from the high-resolution structure of the *Escherichia coli* ribosome (**Fig. 19A**).

We chose number of tertiary contacts as a metric for scoring deletion candidates, because it would allow us to take into account the structural context of the residues being proposed for deletion (i.e. if the residues in question is an outer, solvent-facing loop or if they are buried deep in the PTC of the ribosome). Next, we chose apical stem-loops (henceforth referred to as stem-loops) as the structural motif for deletion because they occur across the entirety of the ribosome and can be standardized in their design. Additionally, previous literature showed that in prokaryotes, stems were among the fastest to evolve, perhaps hinting at greater flexibility for change[86]. It is very possible that other motifs in the ribosome may be amenable for deletion, such as regions that serve as linkers between helices and bulges.

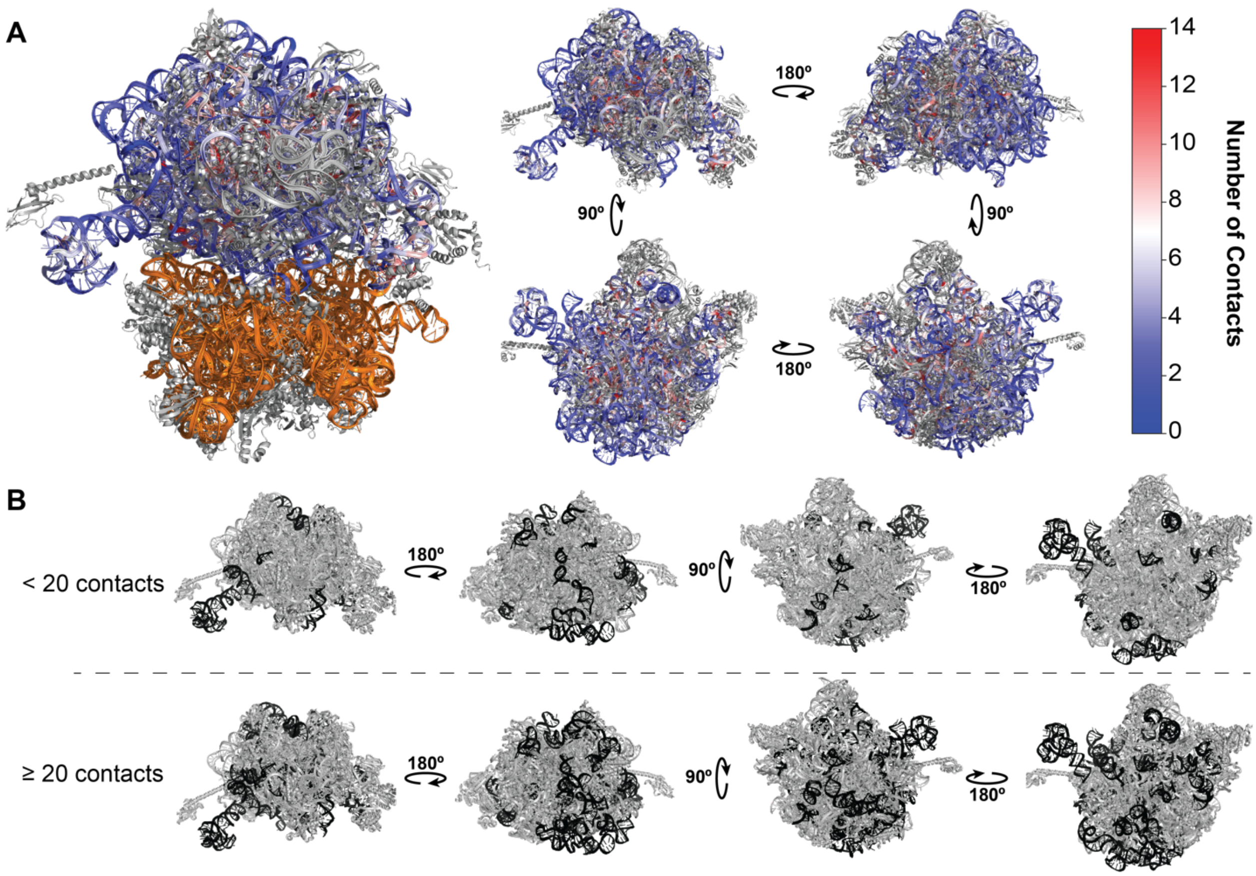

Figure 19. Mapping contacts in the ribosome and designing deletions for screening. (A) The 23S rRNA colored by number of RNA-RNA and RNA-protein contacts per residue. The 16S rRNA is depicted in orange, and the 5S rRNA and ribosomal proteins are depicted in gray. Residues with few (< 7) contacts are colored blue, and residues with many (>7) contacts are colored red according to the colorbar (right). (B) Identifying apical stem-loops and classifying them by thresholds for contacts per loop as visualized on the 3D structure of the 50S subunit of the ribosome. Apical stem-loops were held to three thresholds (0-20, 21-40, and 41-60), but shown are < 20 and ≥ 20 contacts. Proposed designs for deletion are depicted in black, and the rest of the 23S rRNA is depicted in gray. PDB ID: 4YBB.

We then begin narrowing down the number of deletion designs with a set of constraints. The first is that a stem-loop must be deleted at a base pair instead of at a random two residues along the stem. This constraint makes sure that the apical loop is deleted, which often participate in tertiary contact with other parts of the ribosome or proteins. Further, we hypothesized that this may reduce the possibility of leaving a large stretch of unpaired rRNA residues in the wake of the deletion, which in turn might be more likely to engage in deleterious rearrangements in secondary and tertiary structure. Lastly, because we always identified base-pairs as cut points for a given stem-loop, we replaced the deleted residues with a UUCG tetraloop, chosen for its well-known structural stability [87]. We hypothesized, by selecting the UUCG apical loop sequence, that the remaining stem-loop after deletion would still be encouraged to fold into a stem-loop motif. The intent was to observe the impact of the deletion while minimizing disruption to surrounding residues, with hopes that the deletion would result in a shorter stem-loop in the place of a longer stem-loop.

One key goal was to remove human bias from the initial screen of permissible deletions, and to survey the ribosome globally. For each stem-loop identified by our algorithm, we tracked the number of possible hydrogen bond contacts that would be disrupted as a result of the stem-loop deletion. With the goal of ribosome minimization in mind, we set thresholds of the number of contacts (0-20, 20-40, and 40-60) that would be disrupted by the deletion which identified stem-loops of different lengths and locations across the entirety of the ribosome (**Fig. 19B**). This led to two broad classes of stem-loops (<20 contacts and ≥20 contacts) for visualization, which gave us a sense of how many stem-loops would be evaluated as well as how extensive the deletions would be in the context of the ribosome structure. By leveraging computational algorithms to score and identify stem-loops for deletion, we identified 120 stem-loops for our initial screen (**Fig. 19B**).

Screening of permissible single deletions in the 23S rRNA

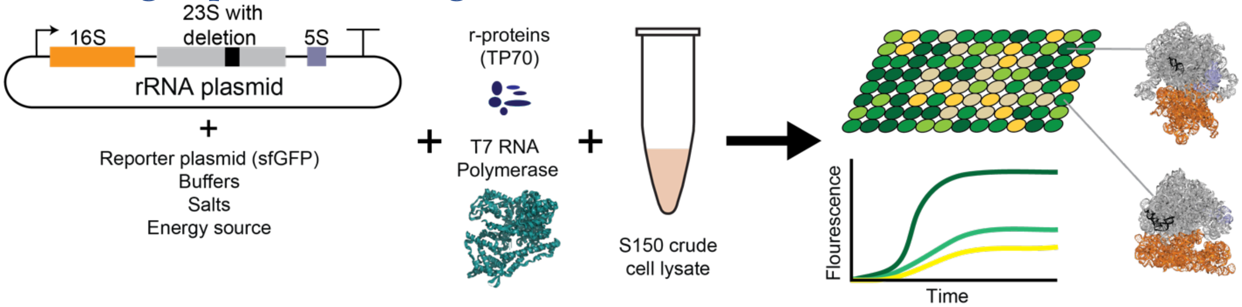

Figure 20. Experimental workflow using ISAT for testing minimized ribosome variants. A plasmid encoding the *rrnB* operon and containing a deletion in the 23S rDNA (left) is combined with reagents, a reporter plasmid, energy sources, salts, and buffers. T7 RNA polymerase and TP70 are added along with ribosome-free S150 crude cell lysate and incubated. Reactions can be monitored on a 384-well plate, where each well corresponds to a specific minimized ribosome variant (right).

After identification of candidate stem-loops in our computational pipeline, we then moved to test the minimized ribosome variants in our *in vitro* ribosome assembly and translation (ISAT) platform (**Fig. 20**). Testing the ribosomes *in vitro* allowed us to test each minimized ribosome design specifically for the function of the ribosome in translation, free from the constraints of cell viability. Briefly, a ribosome plasmid encoding the *rrnB* operon featuring a specified deletion in the 23S rRNA was mixed with necessary components for translation and incubated in S150 ribosome-free crude cell lysate (**Fig. 20**). The reporter, superfolder GFP (sfGFP), would serve as the measurement of translation output for the respective ribosome variant.

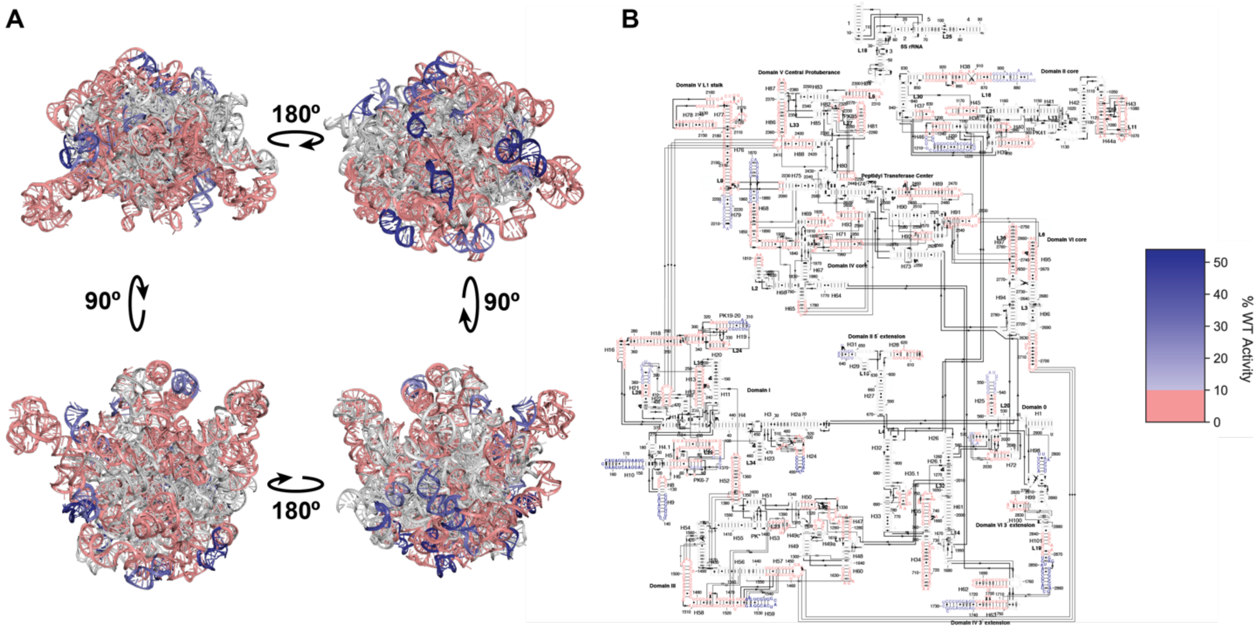

Figure 21. Results from an initial screen of rRNA deletions in the 23S rRNA. Relative activities of deletions are mapped onto the 3D structure (A) and the secondary structure depicting tertiary contacts (B). Stretches of rRNA are colored according to the scale (right), where everything under 10% relative activity is red, and then a gradient towards blue corresponds to higher activity. Values are from two independent experiments of three replicates each experiment (n=3). Untested residues are depicted in light gray.

To our surprise, 30 of the 120 constructs showed activity greater than 10% (**Fig. 21**). To our knowledge, this is the first experimental validation of ribosome minimization across all domains of the *E. coli* ribosome. Mapping our results onto the 3D structure of the ribosome revealed, as expected, that solvent-facing loops are more amenable for deletion compared to apical stem-loops that are more 'inward' facing and thus likely making more contacts with other ribosomal RNA or proteins. For example, most deletions in the peptidyltransferase center did not yield ribosomes capable of translating sfGFP. Consistent with previously reported literature, deletions of the sarcin-ricin loop[84], which has been shown to be important for proper ribosome assembly and function, as well as a deletion at helix 69[85], which has been shown to be important for subunit association as well as ribosome assembly, were both shown not to be permissible with deletion. Deletions in Domain I were particular permissible, especially stem-loops that were solvent-facing, (**Fig. 21A (**top right**), Fig. 21B**). This was particularly interesting, as ribosomal RNA has been shown to be assembled co-transcriptionally, and led us to the hypothesis that the deletions in Domain I may be less detrimental to ribosome assembly and function since it may be folding into its secondary structure in the absence of other domains, and for solvent-facing stem-loops in Domain I, not participating in the rest of ribosome assembly. With the exception of the peptidyl transferase center, we identified successful minimized ribosomes with greater than 10% activity compared to the wild type ribosome in all other domains of the 23S rRNA.

In Domain I, we found permissible deletions (>10% activity of wild type) in Helix 6/Pseudoknot6-7, Helix 7b/Pseudoknot 6-7, Helix 9, Helix 10, Helix 19, Helix 21, and Helix 24. Interestingly, we observed that even small differences in cut points resulted in widely different activities. For example, a deletion of residues 486-494 (in Helix 24) resulted in minimized ribosomes that were 15% as active as wild type ribosomes, but a deletion of residues 485-495, which eliminates just one more base pair upstream of the aforementioned deletion, results in ribosomes that were 49% active. This revealed to us that although our screen was successful at revealing which regions of the ribosome and helices were generally permissible for deletion, but that the constructs identified as successful deletions are sensitive to cut points and potentially design of the "linker" sequence that replaces the deleted residues, which were standardized to UUCG in this experiment.

In Domain II, we identified 6 permissible deletions in Helix 31, Helix 38f/g/h, and Helix 46c. Similar to deletions in Domain I, a deletion of residues 873-904 yielded ribosomes with 22% activity, while deletions of residues 871-906 resulted in 12% activity. In Domain III, we identified 4 deletions, mostly focused around Helix 59 but also one permissible deletion identified in Helix 53. Given the previous literature that Domain III of the *Thermus Thermophillus* ribosome folds to a near-native state *in vitro* independent of the rest of the ribosomal RNA[83], we were surprised that relatively few stem-loops in Domain III were permissible for deletion. Alternatively, if Domain III in the *E. coli* ribosome also folded independent of the rest of the ribosomal RNA, it may be that even small perturbations such as a shortened stem-loop may be enough, in terms of relative disruption, to disrupt Domain III folding and thus negatively impact ribosome assembly.

Only two permissible deletions were found in Domain IV in Helix 63 and Helix 68, which was not surprising given its structural context. Domain IV is buried near the catalytic core of the ribosome, and contains residues that play key roles in translation, such as Helix 69. Helix 69 is known to make two key contacts with A-site and P-site tRNAs, first the apical loop which contacts the minor groove of the A-site tRNA D-stem junction and the stem which contacts the minor groove of the D-stem of the P-site tRNA. In previous literature, deletion of Helix 69 confers a dominant lethal phenotype in cells. However, in a departure from reported results, in which affinity-purified ribosomes lacking Helix 69 were still capable of translation with accuracy near wild type[85], capable of synthesizing a full protein, and EF-G dependent translocation, ribosomes assembled *in vitro* in our reaction did not exhibit detectable levels of activity. This points to possible differences between *in vivo* and *in vitro* assembly of ribosomes, in which *in vivo* assembly may have pathways for rescuing misfolding of rRNAs or compensation for missing helices, whereas ribosomes assembled *in vitro* may be inactive due to the lack of such pathways or overall deficiencies in assembly. Another difference between our results and those in previous work may be caused by heuristics in design (different cut points and linkers), which we observed to be important for minimized ribosome function. Both successful deletions in Domain IV were solvent-exposed stem-loops, consistent with our intuition of which types of deletions may be permitted in the ribosome.

In Domain V, which is known to host the peptidyl transferase center, we identified a single permissible deletion at Helix 79a/b, which lies on the periphery of the ribosome's 3D structure. In Domain VI, we identified 4 deletions spanning Helix 98, and Helix 101. In previous works, Helix 101 was shown to be a permissive site for circular permutation, in which the 23S rRNA is used as a site for linking the 23S and 16S rRNAs together to create the tethered ribosome[24], so permissibility of a deletion in Helix 101 was consistent with its flexibility for mutation.

We identified only a single deletion, residues 2471-2479 in Helix 89, classified as belong to the peptidyl transferase center. To our knowledge, this stretch of residues do not interact directly with other translation machinery (tRNA, EF-Tu, EF-G) and structurally lies towards the outside of the ribosome. One possible role for this helix may be interaction with ribosomal protein L11, but given that L11 makes much more extensive contacts with H42 in Domain II[5, 75], the disruption of contacts due to the deletion of this stretch of residues. Lastly, we found two permissible deletions, in Helix 25a and Helix 25b. As expected, Helix 25a and 25b exist on the periphery of the ribosome, further strengthening our hypothesis that the permissibility of a deletion is closely correlated with solvent exposure of the stem-loop.

Optimization of rRNA deletions through *de novo* computational design

Having observed that many successful deletions were solvent-facing stem-loops on the outer edge of the ribosome and that minute differences in cut points can heavily influence resulting minimal ribosome activity, we asked if we could improve upon the activities of deletions from our initial screen with more careful design of each deletion. To achieve this, we utilized *de novo* RNA design using Rosetta, with the underlying hypothesis that being able to recover a more stable three-dimensional structure may be vital to rescuing minimal ribosome activity. Since Rosetta calculates a relative "score" for each simulation, which acts as a proxy for measuring the energy of all atomic interactions, we believed it was well suited for our underlying hypothesis that the stability of the local structure after deletion was key to activity. Towards this, we looked to test three main hypotheses:

1. If the stem-loop being deleted is in the periphery of the ribosome but likely unstable in its post-deletion state, then redesigning the linker may rescue its activity.
2. If the deletion in question is internal, meaning likely not solvent-exposed and heavily interacting with other RNA or proteins in the ribosome's tertiary structure, then redesigning the linker to form new tertiary contacts may rescue its activity.
3. If a deletion is solvent exposed and the new cut points are likely to be far from any significant tertiary contacts, then it is relatively stable in its activity, meaning small perturbations like alternative cut points will not have significant influence in activity.

For testing Hypothesis 1, we focused on a deletion in Helix 24 of Domain I, which deleted residues 475-509 (**Fig. 21A**). We observed that although the helix is solvent-exposed, the ribosome with a deletion at residues 475-509 with a UUCG apical loop had undetectable activity. Upon close inspection, we realized that although the stem-loop was cut at a base-pair, the residues downstream were not base-paired. This meant that instead of 'shortening' the stem-loop, we had completely deleted Helix 24, and the UUCG apical loop sequence no longer made sense in the new structural context since the residues immediately 5' and 3' of the cut point were likely not forming a stem. Consistent with our hypothesis, Rosetta algorithms returned linker sequences of CA and A as more stabilized linker sequences compared to UUCG, and resulting structures from the simulation revealed the newly designed linkers to be likely to form tertiary contacts with surrounding rRNA residues, further stabilizing its modeled structure (**Fig. 22B**). When tested in ISAT, redesigned ribosomes with the

Helix 24 deletions exhibited 47% and 88% of wild type ribosome activity for CA and A linkers, respectively (**Fig. 22C**). Although we expected some improvement from computational design, this increase was surprising, and further supported our observations from our initial screen that local structure may play an important role in determining overall ribosome structure.

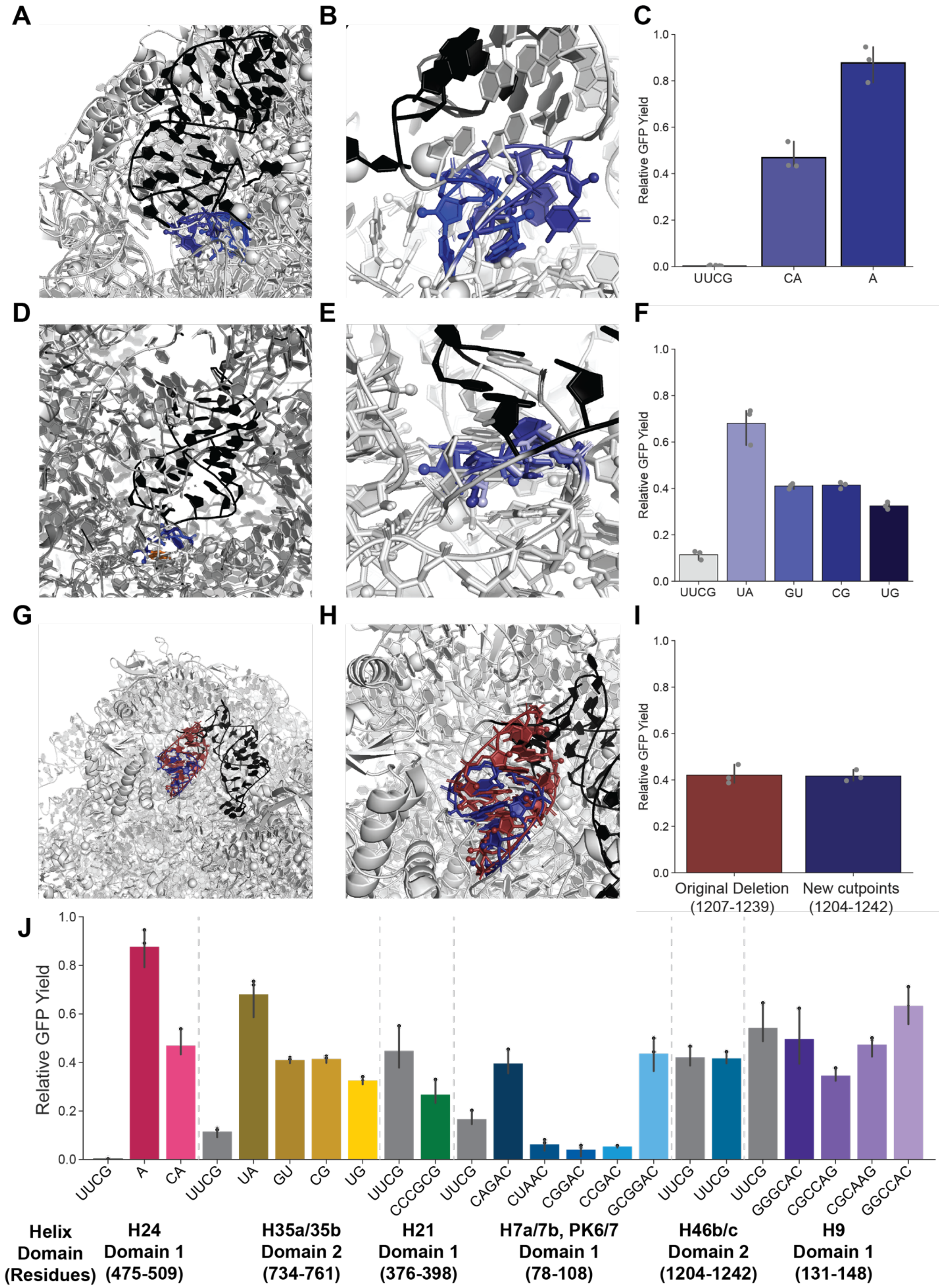
A
B
C
Relative GFP Yield
1.0
0.8
0.6
0.4
0.2
0.0
UUCG
CA
A
D
E
F
Relative GFP Yield
UUCG
UA
GU
CG
UG
G
H
I
Relative GFP Yield
Original Deletion (1207-1239)
New cutpoints (1204-1242)
J
Relative GFP Yield
UUCG
A
CA
UUCG
UA
GU
CG
UG
UUCG
CCCGCG
UUCG
CAGAC
CUAAC
CGGAC
CCGAC
GCGGAC
UUCG
UUCG
UUCG
GGGCAC
CGCCAG
CGCAAG
GGCCAC
Helix
Domain
(Residues)
H24
Domain 1
(475-509)
H35a/35b
Domain 2
(734-761)
H21
Domain 1
(376-398)
H7a/7b, PK6/7
Domain 1
(78-108)
H46b/c
Domain 2
(1204-1242)
H9
Domain 1
(131-148)

Figure 22.Optimization of deletions through *de novo* computational design. (A) A deletion in Helix 24 of Domain I (residues 475-509) lies on the ribosome's surface, but has poor activity when closed with an UUCG linker. (B) Computational design of linkers likely stabilizes the deletion by making tertiary contacts with surrounding residues after the deletion is made. (C) Computationally designed linkers can rescue the activity to 88% of wild type activity. Other proofs of concepts in Helix 35a/35b (D-F) and Helix 46b/c (G-I) show the effects of computational design on minimized ribosome activity. (J) Further testing on additional targets for computational design.

For testing Hypothesis 2, we picked a deletion at Helix 35a/35b in Domain II, deleting residues 734-761 (**Fig. 22D**). The UUCG linker for this deletion exhibited 11% activity, but given its structural context, in which the cut points are surrounded by many rRNA residues, we hypothesized that purposely designing in tertiary contacts could further stabilize the deletion and improve ribosome function (**Fig. 22E**). Since the UUCG tetraloop is not known to heavily favor tertiary contacts, we aimed to recover from our simulations linker sequences that were more likely to make contacts with surrounding residue. Simulations converged to four candidate linker sequences, UA, GU, CG, and UG, and were subsequently tested in the ISAT platform. All four designed linker sequences for this deletion performed better than the original UUCG linker, with activities of 68%, 41%, 41% and 32% relative to wild type ribosomes, respectively (**Fig. 22F**). Again, the improvements in activities were surprising given relatively small changes in the linker sequence. From our initial screen, one leading hypothesis for a predictor of deletion success for a given stem-loop was how solvent-exposed the stem-loop was in the native state. With redesigned linkers aimed at forming stabilizing tertiary contacts yielding large improvements in ribosome activity, it now seemed likely that another important factor for deletion success is the local context of the 'cut points'. By targeting the structural stability of what is left after the deletion into consideration, it may be possible to further improve the activities of minimized ribosomes through more careful design.

Finally, we hypothesized that solvent-exposed deletions that have cut points far from any possible tertiary contacts are unlikely to benefit from further optimization and design. To test this, we examined a deletion in Helix 46b/c of Domain II, which deletes residues 1204-1242 **(Fig. 22G)**. Looking at the likely resulting structure, in which after the deletion there exists another solvent-exposed stem-loop capped by a stable UUCG tetraloop, and with few residues nearby, this deletion seemed unlikely to be further stabilized through tertiary interactions (**Fig. 22H**). To test this hypothesis, we increased the size of the deletion by another three base pairs, with new cut points at residues 1204-1242, and kept the same UUCG tetraloop. The two deletions, which differ in cut point but share very similar resulting structures, were equal within error in terms of its relative activity (~40%) compared to wild type ribosomes (**Fig. 22I**).

As additional proof of concept, we picked additional targets in Domains I and II for redesign (**Fig. 21J**). In one instance, a deletion of Helix 21 (residues 376-398) in Domain I, in which the simulation was only able to converge to a single solution for an alternative linker, a *de novo*-designed linker (5' CCCGCG 3') resulted in a less active ribosome than the original 5' UUCG 3' linker used in the screen. For other design challenges, further optimization yielded a more highly active minimized ribosome variant. In a deletion spanning Helix7a/7b and Pseudoknot 6/7 in Domain I (Residues 78-108), activity was improved from 17% to 40% and 44% for redesigned linkers 5' CAGAC 3' and 5' GCGGAC 3', respectively. Three Rosetta designs, linkers 5' CUAAC, 3' 5' CGGAC 3', and 5' CCGAC 3' resulted in decreased yields to 6.2%, 4.1%, and 5.4%, respectively, highlighting limitations in *de novo* design to improve minimized ribosome activity. Finally, Rosetta design of a deletion in Helix 9 of Domain I (residues 131-148) yielded only modest improvements in activity, with the top design exhibiting 63% activity compared to the original activity of 54%. This was perhaps not surprising given that the initial design of the UUCG tetraloop was already high performing, maybe indicating that the tertiary structure may already be stabilized in the original design and that limitations in activity are not as heavily influenced by lost tertiary contacts.

To our knowledge, this is the first application of *de novo* RNA design in the ribosome, and our results indicate that computational design of RNA structures are capable of improving and optimizing minimized ribosome activity. Through our proof of concept study, we showcase the utility of this approach, and believe it will serve an important role in further minimizing the ribosome.

Combining functional deletions for further ribosome minimization

With results in hand that it was possible to screen the ribosome for permissible deletions as well as evidence that deletions can be further optimized using computational design of linkers and cut points, we looked to extend our minimization effort further by combining amenable deletions. Combining deletions inherently deviates from the original hypothesis behind our screen of permissible deletions, in which we assume the impact of a deletion is somewhat limited to its local context. If such an assumption is true, then the effects of each minimization would be additive. However, we hypothesized that given the complex nature of ribosomal RNA folding, and the ensembles of secondary structure that are likely to exist during the assembly process, it is likely that combinations of deletions would give rise to alternative folding pathways for the variant rRNA. Further, we hypothesized that for *in vitro* biogenesis, for which the folding pathway is not well known, further minimization would make up for possible deleterious effects in ribosome activity with greater efficiencies in folding, which generally increases with decreased lengths of RNA. For a pathway to true minimization to be viable, combinations of single deletions would be absolutely necessary, as it is unlikely that a single deletion would ever be enough to meaningful reduce the size of the ribosomal RNA.

To test whether combinations were possible, we decided to test multiple strategies towards minimization:

1. All pairwise combinations of the top performing deletion from each 23S rRNA Domain.
2. Select combinations of three individual deletions from multiple 23S rRNA Domains.
3. Combine two deletions that, in the native state, make tertiary contacts with each other.
4. Combine the top three performing deletions with a successful deletion pre-design.
5. Combine the top three performing deletions with a successful deletion post-design.
6. Combine two adjacent deletions (proximal in primary sequence).
7. Combine all successful deletions in Domain I.
8. Combine all successful deletions from the original screen with UUCG tetraloops.
9. Combine all successful designed deletions optimized through computational modeling.
10. Combine all successful deletions.

Hypotheses 1 and 2 test if combinations are possible across multiple Domains and if so, what the effects of combinations might be. For each of Domains I-VI, we identified the highest performing single deletion for combination as follows:

Table 6. Deletion with highest activity from each Domain of the 23S rRNA

Domain	Deletion
I	Helix 19, Residues 302-315, linker 5' UUCG 3'
II	Helix 35a/35b, Residues 734-761, designed linker 5' UA 3'

III	Helix 59, Residues 1527-1545, linker 5' UUCG 3'
IV	Helix 68e/f, Residues 1861-1881, linker 5' UUCG 3'
V	Helix 98, Residues 2792-2804, linker 5' UUCG 3'
VI	Helix 101c/d, Residues 2847-2869, linker 5' UUCG 3'

For combinations of deletions across three domains, we chose the following combinations of Domains: (I, II, III), (II, III, IV), (III, IV, V), (IV, V, VI), (I, III, V), (II, IV, VI), (II, IV, V), and (I, III, VI). Hypothesis 3 tests whether we could use successful deletions to inform, spatially, the next targets for minimization. For example, we chose to combine the successful deletion at H24 in Domain I (Residues 475-509, designed linker A) with the successful deletion at H46b/c in Domain II (Residues 1204-1242, linker UUCG). The apical loop of H24 in the native state appears to make contact with H46b/c, (**Fig. 23**) and since each individual deletion does well, the tertiary contact may not be crucial to ribosome function.

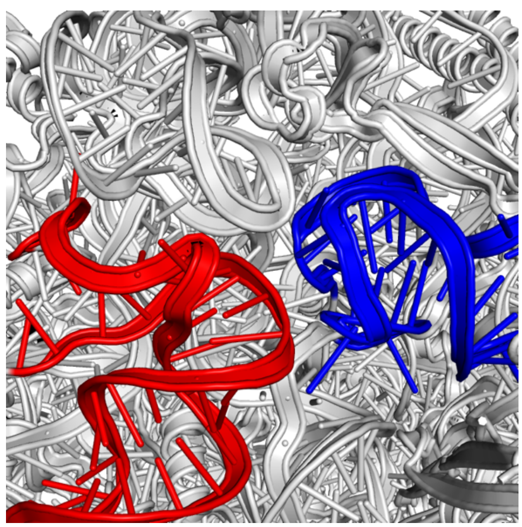

Figure 23. Tertiary contacts between Helix 24 and Helix 46b/c. Helix 24 is depicted in blue, and Helix 46b/c is depicted in blue.

Thus, we reasoned that combining both deletions, in which the loss of tertiary contact from both sides may not be detrimental to ribosome function, this might be a way to maximizing the residues eligible for deletion for a tertiary contact deemed noncrucial. Hypotheses 4 and 5 are intended to test whether the effect of a more stabilized design also carry over to combinations. For this test, we chose to combine three deletions as the base case: a deletion in Helix 19 in Domain I (Residues 302-315, linker 5' UUCG 3'), a deletion in Helix 59 in Domain III (Residues 1527-1545, linker 5' UUCG 3'), and a deletion in Helix 98 in Domain 6 (Residues 2792-2804, linker UUCG). These three deletions were chosen because they, of all the deletions tested, had the highest activity as individual deletions. From the base case, we then tested the effect of adding the previously examined design challenge on Helix 46b/c in Domain II (Residues 1207-1239 or 1204-1242, for original and designed, respectively), a case in which further optimization of cut points did not have an effect at the single deletion level (**Fig. 22G-I**). For Hypothesis 6, we looked to see if two successful deletions were adjacent in sequence space, whether we could simply combine the two stretches of deletions into a single stretch of rRNA for deletion. We chose the deletions at Helix 9 (Residues 131-148, designed linker 5' GGCCAC 3') and Helix 10 (Residues 151-175, linker 5' UUCG 3') to combine, since the end of the first helix was only 3 bases away from the next deletion. Hypotheses 7 through 10 served as moonshots to see if we could in a single leap combine a large number of deletions for maximal minimization in hopes of identifying a promising starting point for optimization. Table 7 below lists the deletions that were chosen for combination for hypotheses 7-10.

Table 7. Deletions chosen for combination

Hypothesis	Deletions chosen

(7) All successful deletions in Domain I	• Helix 7a/b, Pseudoknot6/7 (Residues 78-108, linker 5' UUCG 3') • Helix 9 (Residues 131-148, designed linker 5' GGCCAC 3') • Helix 10 (Residues 151-175, linker 5' UUCG 3') • Helix 19, Residues 302-315, linker 5' UUCG 3' • Helix 24 (Residues 475-509, designed linker A)
(8) All successful deletions from the original screen with UUCG tetraloops	• Helix 7a/b, Pseudoknot 6/7 (Residues 78-108, linker 5' UUCG 3') • Helix 9 (Residues 132-147, linker 5' UUCG) • Helix 10 (Residues 151-175, linker 5' UUCG 3') • Helix 19 (Residues 302-315, linker 5' UUCG 3') • Helix 24 (Residues 485-495, linker 5' UUCG 3') • Helix 46b/c (Residues 1207-1239, linker 5' UUCG 3') • Helix 59 (Residues 1527-1545, linker 5' UUCG 3') • Helix H68e, H68f (Residues 1861-1881, linker 5' UUCG 3') • Helix 98 (Residues 2792-2804, linker UUCG) • Helix 101c/d (Residues 2847-2869, linker 5' UUCG 3')
(9) All successful designed deletions optimized through computational modeling.	• Helix 7a/b, Pseudoknot 6/7 (Residues 78-108, linker 5' GCGGAC 3') • Helix 9 (Residues 131-148, designed linker 5' GGCCAC 3') • Helix 24 (Residues 475-509, designed linker A) • Helix 35a/b (Residues 734-761, linker 5' UA 3') • Helix 46b/c (Residues 1204-1242, linker 5' UUCG 3')
(10) All successful deletions.	• Helix 7a/b, Pseudoknot 6/7 (Residues 78-108, linker 5' GCGGAC 3') • Helix 9 (Residues 131-148, designed linker 5' GGCCAC 3') • Helix 10 (Residues 151-175, linker 5' UUCG 3') • Helix 19 (Residues 302-315, linker 5' UUCG 3') • Helix 24 (Residues 475-509, designed linker A) • Helix 35a/b (Residues 734-761, linker 5' UA 3') • Helix 46b/c (Residues 1204-1242, linker 5' UUCG 3') • Helix 59 (Residues 1527-1545, linker 5' UUCG 3') • Helix H68e, H68f (Residues 1861-1881, linker 5' UUCG 3') • Helix 98 (Residues 2792-2804, linker UUCG) • Helix 101c/d (Residues 2847-2869, linker 5' UUCG 3')

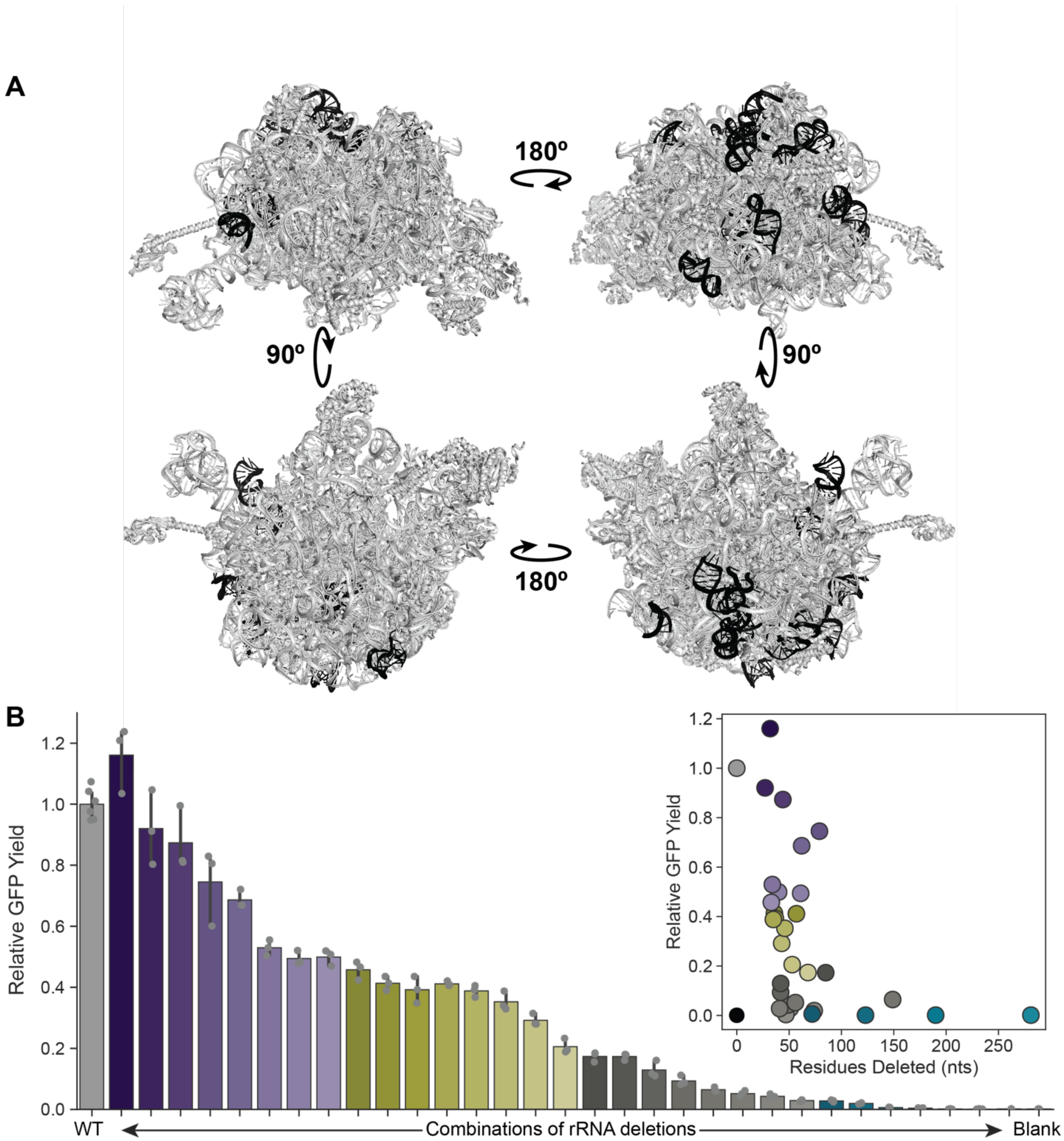

Figure 24. Activities of combinations of select individual deletions. (A) Deletions chosen for combination depicted on the 3D structure of the ribosome. (B) Combinations of rRNA deletions display a wide range of activities, and are not strongly correlated with the number of residues deleted (inset).

When the top performing single deletions to be combined are projected onto a three-dimensional structure of the ribosome (**Fig. 24A**), it becomes apparent that the best designs are concentrated in Domain I and near the exit tunnel opening. Intuitively, this makes sense, as deletions at the subunit interface or the near the central protuberance may be subject to a large disruption in contacts critical for proper ribosome assembly.

ISAT testing of minimized ribosomes featuring combinations of deletions according to the hypotheses above reveals a wide range of activities relative to the wild type ribosome (**Fig. 24B**). Surprisingly, many minimized ribosomes featuring two or more deletions were able to assemble and synthesize sfGFP, with only 5 of the 31 deletion combinations tested exhibiting no signal. Of the 5 failures, three belonged to Hypotheses 8, 9, and 10. Remarkably, the combination tested in Hypothesis 7, which combined all successful deletions in Domain I, showed 6.4% activity. Although not highly active, this suggests that deletions in Domain I can be successfully combined to significantly minimize the 23S rRNA, totaling a deletion of 113 rRNA residues. Eight of the 31 combinations tested showed 50% relative activity or greater (within error). Of the eight, five were pairwise combinations between deletions in Domains I/V, III/IV. III/V, III/VI, and IV/VI. Surprisingly, combinations between Domains III/V and Domains I/V exhibited 100% and 92% activity, respectively.

For Hypothesis 1, many pairwise combinations showed robust activity. In addition to the aforementioned highly active (>90% activity) combinations, the existence of many pairwise combinations with greater than 50% activity was encouraging in our path of minimizing the ribosome. Per Hypothesis 2, select triple combinations of deletions also showed good activity. In particular, the combination of deletions in Helix 35a/b (Residues 734-761, linker 5' UA 3'), Helix H68e, H68f

(Residues 1861-1881, linker 5' UUCG 3'), and Helix 98 (Residues 2792-2804, linker UUCG) showed 69% activity.

For Hypothesis 3, in which we combined deletions at Helix 24 and Helix 46b/c, deleting a close to contiguous stretch of RNA yielded a ribosome that had 1.9% activity relative to a wild type ribosome. While disappointing, the result hints at the fact that there may be neighboring effects of deletions on overall ribosome structure. That is, Helix 24 deleted in isolation can be compensated for in rRNA folding, but when two closely interacting and nearby stem-loops are deleted, the challenges of functionally active ribosome assembly compounds combinatorically. When testing Hypotheses 4 and 5, we found that the combination featuring the "designed" construct fared worse (17.3%) than the combination featuring the original cut point variant (74.5%). In fact, the high activity of the combination featuring the original cut point variant was surprising, given that it combined four separate deletions and outperformed every combination of three individual deletions. Taken in isolation, we previously observed no detectable effect of customizing the cut point for the Helix 46b/c construct and hypothesized that it may not be affected since the resulting deletion doesn't feature an obvious detriment to its structural integrity. However, these results seem to suggest that there are indeed higher order interactions possibly at play for generating a ribosome with successful deletions, since the effect of a mere three base pairs yielded a difference of over 50% in relative wild type activity. Although the mechanism by which this is happening is not clear, it may hint at the notion that deletions of rRNA may have far-reaching effects on ribosome assembly beyond its immediate vicinity of residues after cutting. In addition, it showed that a more 'optimized' sequence may not already result in a better minimized ribosome when deletions are combined, again hinting at the complex effect of rRNA minimization on global ribosome assembly and function. Testing hypothesis 6, combining two adject deletions in Helix 9 and Helix 10 resulted in a ribosome with 29% activity, suggesting that this may be a viable way for further minimization of ribosomes, especially given that a better linker which takes into account both strands of RNA deletions may improve the activity even further.

To our knowledge, this study represents the first reported work of ribosome minimization in which multiple deletions were successfully combined and tested. In our pilot study, we show that combinations of individual deletions yield functioning ribosomes, and provide the first experimentally validated strategy towards ribosome minimization as well as *de novo* RNA design in the ribosome.

Discussion

In this work, we present a possibly strategy for ribosome minimization. By leveraging a high-resolution structure of the E. coli ribosome, we computationally map and identify deletions of 120 different apical stem-loops in the 23S rRNA of the ribosome. We then built and tested these ribosomes featuring single deletions in our in vitro ribosome synthesis assembly and translation assay, which allow one-pot transcription of rRNA, assembly into ribosomes, and translation of a reporter protein as a measurement of overall ribosome function. In a first pass screening permissible deletions in the ribosomal RNA, we identified 30 minimized ribosome variants that retained more than 10% activity compared to a wild type ribosome. We then applied computational algorithms for *de novo* RNA design to optimize a select number of deletions for improved activity. Our design strategy, which was to optimize cut points as well as the linker RNA sequence to improve structural stability of the remaining RNA residues after deletion, proved successful, improving activities from 0 to 88% in one case, and from 11 to 68% in another example. We then extended this approach to 6 different deletions, and showed improved activity for 4 of the cases. Finally, we tested 31 different combinations of deletions based on 10 hypotheses, including pairwise and triple deletions of high-activity single deletions as well as combining all deletions in Domain I. Surprisingly, combining all successful deletions in Domain I resulted in a ribosome with non-zero (6%) activity, and saw greater than 50% relative activity for 8 of the 31 combinations tested, hinting that combining single deletions may be a viable way towards ribosome minimization in addition to computational design.

Ribosome minimization may offer a path for accelerated ribosome engineering free from the constraints of evolutionary conservation and cell viability, at the same time reducing the overall size and complexity of the ribosomal RNA. The work presented is by no means exhaustive, but rather meant as a proof of concept of one promising strategy for ribosome minimization. To our knowledge, this is the first reported study featuring multiple deletions in ribosomal RNA, and also the first reported study featuring computational design for engineering RNA machines. Moving forward, we expect that efforts to better understand how these minimized ribosomes differ from the wild type ribosome, especially efforts rooted in structural biology and RNA biochemistry, will offer insights into ribosome assembly, function, and architecture. Better understanding of the structural effects of ribosome minimization, as well as *de novo* RNA structure prediction in the context of a macromolecular machine like the ribosome, will, in turn, offer greater insights and improved strategies for ribosome minimization. We believe ribosome minimization has great potential for improving our understanding of the origins of life as well as accelerating efforts to engineer the translation apparatus for the production of new medicines and materials.

Materials and Methods

Identification of apical loops for deletion

From the structure of the ribosome (PDB ID: 4YBB), we first used a Python script to calculate the contacts made by each residue in the 23S rRNA. In quantifying contacts for this step, we counted contacts at the residue level, meaning that if two residues made multiple atomic contacts, it would still count as only one contact. This allowed us to dampen biases towards certain types of contacts, for example, pi-stacking between residues would contain many more contacts compared to base-pairing or other tertiary contacts. We then converted the three-dimensional structure into a map of secondary structures (also known as dot-bracket notation to denote pairs base-paired residues as well as unpaired residues) using DSSR, and then identified sets of apical stem-loop based on three thresholds (0-20, 21-40, 41-60+ contacts). Briefly, the algorithm would iterate through possible deletions of a given helix, starting with the smallest possible deletion (apical loop sequence + single base pair), and then subsequently add each additional base pair. As it iterates through the stem-loop, it calculates the number of contacts made by the stem-loop and once it reaches a threshold, thereby maximizing the size of the deletion for that given threshold, stores in memory the residues for that given deletion design. Of note, each apical stem-loop was constrained to start and end at a base pair, that is, when imagining the deletion as a 'cut', the cut would occur at a base pair without leaving any dangling single strands. Another Python script generated the sequence of the 23S rRNA without the identified apical stem-loop, and in place of the deleted residue, inserted a UUCG tetraloop, selected for its high stability and frequent occurrence in nature. The resulting sequences of 23S rRNA were converted to DNA sequences, and passed onto synthesis by a third party vendor (Twist Biosciences).

Preparation of plasmids for testing

23S rRNA variants encoding the minimized ribosome variants were synthesized and cloned into the pT7rrnB backbone which contains the rest of the rrnB operon including the 16S and 5S rRNA sequences (Twist Biosciences). Plasmids were resuspended at a concentration of 10 ng/μL and 10 ng of the plasmid was transformed into 25 μL of DH10β cells via heat-shock transformation. Briefly, cells resuspended in 10 mM calcium chloride were mixed with the plasmid and incubated on ice for 30 minutes. After incubation, the cells were subject to a heat-shock at 42 °C for 45 seconds, then immediate incubation on ice for 2 minutes. Then, each transformation was recovered in 300 μL of LB-Miller media in a 96-deep well plate (Ranin) sealed using a breathable sealing film (Axygen) and incubated at 37 °C with orbital shaking at 250 rpm for 1 hour. After recovery, 25 to 50 μL of the recovery was plated on LB-agar plates containing 100 μg/mL carbenicillin and incubated at 37 °C for 14-16 hours until colonies appeared. After incubation, a colony was used to inoculate 50 mL of LB-Miller containing 100 μg/mL carbenicillin in a baffled flask and incubated at 37 °C for 16-18 hours with orbital shaking at 250 rpm until saturation ($OD_{600} > 4$). Plasmids were extracted from the culture using a ZymoPURE II Plasmid Midiprep kit (Zymo Research). After plasmid extraction, ethanol precipitation was performed. Briefly, 20 μL of 3M sodium acetate at pH 5.2 was added to the plasmid in 200 μL of nuclease free water (final concentration 273 mM sodium acetate), then 600 μL of 100% ethanol added, mixed thoroughly, and stored at -20 °C for at least 12 hours. After incubation at -20 °C, samples were spun down at 15,000 xg for 15 minutes, pellets washed with 500 μL of 70% ethanol, and spun down at 15,000 xg for 15 minutes to recover the pellets. The 70% ethanol was removed, and the resulting DNA pellet was resuspended in nuclease free water or ISAT buffer (for use in an acoustic liquid handling robot) until a concentration of 200 ng/μL was reached.

Preparation of ribosome-free S150 cell lysate and ribosomal protein (TP70)

S150 crude cell lysate from the *E. coli* MRE600 strain was prepared as previously described[33, 39, 40]. Ribosomal proteins (Total Protein 70, TP70) was also prepared from MRE600 strains. MRE600 strains were grown in 4 L (split into four baffled flasks of 1 L each) of 2XYPTG media until an OD between 3 and 4 was reached. Cells were then harvested via centrifugation at 5,000 xg for 10 minutes. The media was removed, and cell pellets were resuspended in Buffer A (20 mM Tris-hydrochloric acid at pH 7.2, 100 mM ammonium chloride, 10 mM magnesium chloride, 0.5 mM ethylenediaminetetraacetic acid, 2 mM dithiothreitol). Centrifugation and resuspension were carried out two more times, then a final centrifugation was used to collect the cells. After centrifugation, the cell pellet was weighed. The resulting pellet was snap-frozen in liquid nitrogen, and stored at -80 °C. The next day, cell pellets were resuspended in Buffer A at a ratio of 5 mL of Buffer A/1 g of cell pellet weight. After resuspension, the resulting mixture was passed through an 18-gauge needle to ensure complete resuspension before homogenization. Homogenization was performed at 25,000 psi in a C3 Avestin Homogenizer (Avestin). After homogenization, centrifugation at 12,000 xg for 12 minutes was performed to pellet out any insoluble components and the supernatant loaded atop a sucrose cushion (20 mM Tris-hydrochloric acid at pH 7.2, 500 mM ammonium chloride, 10 mM magnesium chloride, 0.5 mM ethylenediaminetetraacetic acid, 2 mM dithiothreitol, and 37.7% w/v sucrose). Samples were then subject to centrifugation at 90,000 xg for 18 hours. After the initial ultracentrifugation, samples were centrifuged again at 150,000 xg for 3 hours to completely pellet out any ribosomes and insoluble particles. Resulting samples were subject to dialysis in dialysis tubing with a molecular weight cutoff of 3,500 Da against 100x volume of ISAT Buffer (50 mM 2-[4-(2-hydroxyethyl)piperazin-1-yl]ethanesulfonic acid, 10 mM magnesium glutamate, 200 mM potassium glutamate, 0.5 mM ethylenediaminetetraacetic acid, 2 mM dithiothreitol, 1 m spermidine, and 1 mM putrescine) three times for at least one hour, and then once more overnight (12-14 hours). The following day, the dialyzed lysate was then concentrated in centripreps (Amicon) with molecular weight cutoffs at 3,000 Da and to a target A_{260} value of 25.

Screening of ribosome variants via in vitro ribosome assembly and translation using an acoustic liquid handler

Plasmids encoding ribosome variants were resuspended in ISAT buffer to a final concentration of 200 ng/μL. For all liquid dispensing steps, the Echo 525 liquid handling robot (Beckman Coulter) was used. 30 μL of each ribosome plasmid was transferred to an Echo 384-well Polypropylene 2.0 Plus plate (Beckman Coulter) as the source plate. All other reagents (reporter plasmid, salts, energy sources, enzymes, lysate, ribosomal proteins) were prepared in a 6-well Echo Qualified Reservoir plate, volumes adjusted depending on the number of reactions in the experiment. Reactions were set up to a final volume of 5 μL, comprising 1.65 μL of the ribosome plasmid (using the 384PP_Plus_AQ_BP liquid class) and 3.35 μL of all other reagents (using the 6RES_AQ_BP2 liquid class) which were dispensed by the Echo 525 liquid handler. A 384-well black wall, optically clear bottom plate coated with poly-D-Lysine and collagen (Thermo Scientific) was used as the destination plate. The plasmid was first dispensed, followed by the mixture containing the lysate and enzymes to minimize the time at room temperature for the crude cell lysate and T7 RNA polymerase.

Final concentrations in the reaction were: 4 nM ribosome plasmid, 4 nM sfGFP plasmid, 1.2 mM adenosine triphosphate, 0.85 mM guanosine triphosphate, 0.85 mM uridine triphosphate, 0.85 mM cytidine triphosphate, 34 mg/mL folinic acid, 170.6 mg/mL transfer RNAs from MRE600, 7.18

mM magnesium glutamate, 203.6 mM potassium glutamate, 10 mM ammonium glutamate, 3.0 mM amino acids, 0.33 mM nicotinamide adenine dinucleotide, 0.27 mM acetyl coenzyme A, 55.9 mM 4-(2-hydroxyethyl)-1-piperazineethanesulfonic acid pH 7.6, 4.0 mM oxalic acid, 1.52 mM spermidine, 1.02 mM putrescine, 42 mM phosphoenolpyruvate, 2% w/v polyethylene glycol 6000, 2.0 mM dithiothreitol, 0.417 μM TP70, 40% v/v S150 crude cell lysate, and 0.16 mg/mL T7 RNA polymerase.

After dispensing, the reactions in the final destination plate were spun down at 2500 rpm for 1 minute, then loaded onto a Synergy H1 Hybrid Multi-Mode Plate Reader (Biotek) for incubation at 37 °C for 12 hours. Fluorescence was monitored in the plate reader every 5 minutes, with excitation/emission at 528/485 mm. For negative controls, a blank reaction was assembled that did not contain any plasmids encoding ribosomal DNA, and the signals from these reactions were subtracted from readings for samples being tested.

Validation of ribosome variants via in vitro ribosome assembly and translation by hand

For further validation, to account for run-to-run variability on the Echo acoustic liquid handling robot, which has been known to exhibit inconsistencies depending on the reagents being dispensed and the sensitivity of the reaction towards small variations in volume, we set up ISAT reactions by hand. Notable differences when setting up the reaction by hand were that the ribosome plasmids were resuspended in nuclease free water instead of ISAT buffer, and that the reactions volumes were 10 μL, to avoid errors in pipetting volumes under 1 μL. The same destination plate and method for assaying was used for the reaction setup and monitoring as describe above.

Rational and computer-guided design of replacement loops

For selected deletions, we modified the stepwise Monte Carlo (SWM) algorithm for RNA structure prediction [72] to permit the addition of a randomly selected nucleotide, rather than a nucleotide of fixed sequence. For each simulation, we monitored the progress of the simulation by tracking the root-mean-standard-deviation (RMSD) vs. Rosetta Score metric. RMSD describes the likely error in the atomic positions calculated by Rosetta, while the Rosetta Score serves as a proxy for the thermodynamic stability of the RNA being simulated. If both RMSD and Rosetta Score move towards convergence, the simulation was deemed successful and resulting structures and sequences were extracted. For many design simulations, the simulations failed to converge and were not evaluated experimentally as a result.

In several cases, we evaluated multiple possible cut points, that is, rather than the original cut point identified in the initial screening algorithm, we looked to see if there were more favorable cut points from which to design a *de novo* sequence from using SWM. In particular, cases in which a deletion occurred near a multiway junction or cases where the stem in question made substantial tertiary contacts with another RNA or protein motif necessitated the consideration of alternative cut points. Starting template PDB files and Rosetta command lines are available at www.github.com/everyday847/loopbyloop for all simulations conducted.

Author Contributions

D.S.K., M.C.J., A.W.M., and R.D. conceived the study and designed experiments. D.S.K., E.J.B., and E.N.R. carried out all experimental work. D.S.K. analyzed results. A.M.W. carried out computational modeling and designed *de novo* RNA linkers and cut points for optimized minimal ribosomes. K.K. and D.S.K. designed initial studies. D.S.K., A.M.W., M.C.J., and R.D. wrote the manuscript with participation by all authors.

Conclusion and Future Outlook

The work presented here represents just the beginning of a true exploration into ribosome engineering and evolution. The development of Ribo-T v3, I hope, will be helpful for ribosome engineers both in the Jewett Lab and the broader scientific community. The minimal ribosomes created in part of this work will also serve to map the permissibility of alterations in ribosome architecture and hopefully shed light into the complex phenomena that is ribosome biogenesis and rRNA folding into mature subunits. Finally, underlying both efforts, is a theme of approaching the ribosome from a structure-first perspective, thereby highlighting the potential of computational design algorithms for better understanding and *de novo* designing engineered ribosomes. To my knowledge, this represents one of the first instances of computational RNA design being applied to machines as large as the ribosome, and I expect this field to grow with advancements in both experimental and computational ribosome engineering coming of age at a rapid pace.

The invention of Ribo-T v3 and recent works highlight that the tethered ribosome still has room for improvement. Fundamental limits may exist to the current architecture of Ribo-T, where tethers connect H101 connects to h44, relying on a circularly permutated 23S rRNA, which may result in incomplete large subunit maturation or processing. A specific limitation of the work is that selection for an improved tethered design was carried out using the Squires strain in LB media, possibly obfuscating better designs from being detected during selection. Repeating the selection using a FACS-based method, where an orthogonal Ribo-T is challenged to translate orthogonal GFP or another reporter such as orthogonal chloramphenicol acetyltransferase may be a more sensitive method for determining winning genotypes, and would be very interesting to see if certain tether designs are specifically better at orthogonal translation. One particular area to address is if the "clamshell theory", first posed by an iteration of the stapled ribosome, applies heavily to tethered ribosomes. It is not reported in literature, although the structure of the improved stapled ribosome was reported, whether any stapled ribosomes were observed *in trans* in the cell. Underlying the clamshell theory is the notion that tethered ribosome often exist in the open positions, and their subunits are able to freely associate with wild type subunits. If true, then there may be associated challenges in evolving the ribosomal large subunit's rRNA if the mutations that may be advantageous for a given function also happen to be dominant lethal.

As for ribosome minimization, the door is wide open. The works in my dissertation show that minimization of the 23S rRNA is possible, and that computational algorithms can be applied to design higher-functioning minimized ribosomes for select constructs. We foray into combining multiple individual deletions, and show that it is also possible. A clear next step in this project is to utilize molecular biology to build a library of all possible combinations of deletions as featured in this work, and combine our *in vitro* ribosome assembly and translation (ISAT) platform with ribosome display, termed RISE, to select for the most functional variants. It is possible that this work can also be carried out in the Squires strain, thereby taking advantage of the life/death selection available to *in* vivo selection platforms, but concerns exist with possible recombinations or other sources of background that occur in living cells. Applying selections to discovering minimized ribosomes, which would allow for randomization of the linkers, could complement current methods for utilizing stepwise Monte Carlo in Rosetta to design improved linkers for minimal ribosomes. When enough data has been collected, it may be possible to apply methods in statistical learning to improve predictive models for designing minimized ribosomes based on structure. One day, it should be possible to apply to the ribosome what has been achieved with G-coupled receptors, in understanding its dynamic changing structure linked to function. Linking multiple deletions that are far apart in primary sequence, but mutually advantageous, should also be considered. If done *in vivo*, this problem can be directly solved by Evolink. If performed *in vitro*, it should be then possible to reverse transcribe the 23S rRNA, clone it into a backbone, then apply Evolink. After further minimization of the ribosome, one would learn much about the limits of ribosome architecture if a structure, even a crude one (~10-12 Å) could be obtained, as would complimentary efforts in ribosome foot printing to understand how the minimized ribosome may behave in translation.

A crucial next step in both projects moving forward will be to apply fundamental biochemistry and structural biology experiments to better understand these systems for ribosome engineering. For example, the clamshell theory for Ribo-T could be answered in part by the utilization of in-cell cryo-electron tomography, which could allow direct visualization of tethered ribosomes to observe if ribosomes are associating *in trans*. Further, the application of chemical mapping (SHAPE-Seq) could be invaluable in understanding the secondary structures that exist in engineered ribosomes, even wild type ribosomes assembled in ISAT. Recently, the structure of an engineered ribosome more permissible towards β-amino acids, termed the P7A7 ribosome, was solved by the laboratory of Jamie Cate, and revealed the peptidyl transferase center to be disordered, such that it could not be resolved using cryo-electron microscopy. Techniques like chemical mapping, cryo-EM, and cryo-ET all suffer from limitations in resolution: if the ribosomes exist in a massive ensemble of possible secondary and tertiary structures, these experiments may not be helpful in answering the physical state of engineered ribosomes. But any lessons learned from such efforts, which expand our fundamental understanding of the ribosome at the atomic and molecular level, would accelerate ribosome engineering tremendously, and should be heavily considered.

Finally, combining our efforts in ribosome engineering with our advances in the Flexizyme technology should be a fruitful area for exploration. I explored the possibility of making possible polymerization reactions using mutant ribosomes briefly, but wish I had spent more time on it. I believe it should be possible, given the expertise and technologies available, to tackle this substantial challenge.

In conclusion, I am so grateful to have explored the engineering of ribosomes out of their evolutionary trap, and I eagerly look forward to the exciting progress that is forthcoming from the scientific community.

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Appendix

Table 8. Minimized ribosome variants designed and tested

Residues deleted	Domain	Helices covered in deletion	Linker sequence (RNA)	DNA sequence tested (encodes for 23S rRNA, no processing stems, 5' → 3')
87-95	1	H7b,PK6-7	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTTCGCCGTTATAACCGGCGATTTCCGAATGGGGAAACC CAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTA ATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGA GGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCG AACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAG TGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCC CGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGC GGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTC CAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACC GTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAA AAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACG CTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCG ACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAA GGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAG ACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTT GGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAA ATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAA CCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCG CCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAA GGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATA CCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAAC GTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAG GTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGC CCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAA AGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGA AGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGC GACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCT GCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTG CGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCG CTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGG GCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTA GTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTG CGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGG TTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATC CGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGT GCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAG CATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGG TCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGA AGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCA CGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAAT CAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACA CAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA

				GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
132-147	1	H9	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCATTCGTATCATTAACTGAATCCATAGGTTAATGAGGC GAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAG AAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGG AGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGC GTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACAC AAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACA CGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGC TAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGG GAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAAC CTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGC GTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATAT TCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAAC CGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAA ACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAAC ACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCG GATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGA GATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGT GAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGG TCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGA GAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCG TCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCC AAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGA CAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAA GCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATG TAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGC TTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAA GGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAAT GCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT

				AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
153-173	1	H10	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTCGTGAGGCGAAC CGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATC AACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAG CCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGG AAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAAT GCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGT ATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATA CTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAG GCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAA ACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTG ACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGT AGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGT CTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCG GTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAAC TGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGAC TTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGC TGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTC ATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCC CGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGT TATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGA AGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTC ATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCA GGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAA TAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGG GGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGC GTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGT GCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGA CATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGA AGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGA GTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGA AACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGG GACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGT TTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCA AGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAA CAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAA CATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAG AATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGG CAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGT AGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGA TACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTG CAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGG TGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCT TGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGT CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT

				GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
151-175	1	H10	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATTTCGAGGCGAACCGGG GGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACC GAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCC AGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAA GGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCA CATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATC CTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTC CTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCG AAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACC GTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACT GCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGC AAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTT AACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGT GATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTG GAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTT GTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTG GTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCAT CTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCG ACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTA TCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAG AGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCAT GGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGG ATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAG CTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGC TAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG

				ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
302-315	1	H19	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGTTCGCGCGATACAGGGTGACAGCCCCGTACA CAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGAC ACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGG CTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAG GGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAA CCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGG CGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATA TTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAA CCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGA AACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAA CACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGC GGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGG AGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCG TGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGG GTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGG AGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCC GTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCC CAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAG ACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAA AGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGAT GTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACG CTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGA AGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAA TGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA

				CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
486-494	1	H24	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCTTCGGGAGTGAAA AAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGC TTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGA CTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAG GGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGA CCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTG GGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAA TTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAA CCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCG CCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAA GGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATA CCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAAC GTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAG GTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGC CCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAA AGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGA AGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGC GACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCT GCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTG CGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCG CTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGG GCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTA GTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTG CGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGG TTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATC CGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGT GCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAG CATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGG TCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGA AGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCA CGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAAT CAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACA CAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA

				AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
541-552	0	H25b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CTTCGGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTA TATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAA ACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCG AAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTA ACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAG CGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGG GAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTC GTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGG GGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCG GAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTC CGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTC CCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCA GACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGA AAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGA TGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGAC GCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCG AAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGA ATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC

				ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
540-553	0	H25b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG TTCGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATA TTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAA CCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGA AACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAA CACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGC GGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGG AGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCG TGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGG GTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGG AGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCC GTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCC CAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAG ACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAA AGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGAT GTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACG CTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGA AGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAA TGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG

				ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
640-648	2	H31	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTTTCGGCGTTAAGTTGCAGGGTATAGA CCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTG GGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAA TTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAA CCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCG CCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAA GGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATA CCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAAC GTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAG GTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGC CCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAA AGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGA AGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGC GACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCT GCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTG CGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCG CTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGG GCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTA GTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTG CGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGG TTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATC CGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGT GCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAG CATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGG

				TCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGA AGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCA CGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAAT CAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACA CAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
708-723	2	H34b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GTTCGTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGG ATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAG ATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTG AATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGT CATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAG AATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGT CGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCA AAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGAC AGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAG CGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGT AACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCT TATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAG GTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATG CTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCC GGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGG TGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATG GGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGG GGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCC GGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAA TCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAG

				CAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGG TAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTA GAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACT AGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGAT ATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCG AAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
704-727	2	H34b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTTTC GGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTG TGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGG TTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCT CCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGAC TTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATC ACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAG GGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGG TTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGAT GTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGC TCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCT AAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTG TTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTG TGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAA GTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACC AAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGA CCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAG GTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGG AGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAG

				CGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCT GAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAAT GCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCA AATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATAC CAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAA TGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
873-904	2	H38f,H38g, H38h	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTTT CGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGAGAC ACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAAC CCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGG AAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTA GAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTC GAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGC ACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGG GGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATG CTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATA AAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCC TGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGG CGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTC

				CTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTA TGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGC TGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGA TGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTC CAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCC CAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCT TGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGT AACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCT CGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTG CAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTG GACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAA TTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCC GGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGA AATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAA TGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAA CTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAG ACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCC TTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCC AGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTT GATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGT CTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTA ACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCA GGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCG TGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCG GTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGT ACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATC GACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCT GGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTA AAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTC GGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCT GCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTG TTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGC GGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCC CCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAA CGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGC AGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCT TAACCTT
871-906	2	H38f,H38g, H38h	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACAC GGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAG ACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACG ATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGC AGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTC GGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGA AGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGC GTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGA GGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCG GGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCC

				AACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGG CCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTA CTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTG GCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTT TTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGAC GAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAG GAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAA ACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGA GAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAAC TTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGC GGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAA CTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGA CGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATT GATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGG TAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAAT TCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
1092- 1099	2	H44a	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGTTCGCTCACTGGTCGAGTCGGCCTGCGCGGA AGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGC GACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCT

				GCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTG CGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCG CTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGG GCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTA GTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTG CGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGG TTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATC CGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGT GCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAG CATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGG TCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGA AGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCA CGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAAT CAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACA CAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1165- 1184	2	H45a,H45b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG

				CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CTTCGGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTG CTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGAC ATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAA GACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAG TCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAA ACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGG ACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTT TAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAA GGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAAC AAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAAC ATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGA ATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGC AAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTA GGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGAT ACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGC AAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGT GCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTT GATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTC CTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCA CGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACT CAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGG CAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACAC TGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTG AAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACC ACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGG TTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCT CCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCC TGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCT TGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGG TCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCA ACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCC CAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCG GCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATG GCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAAC GTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGA GAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTG GACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGC CCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTA AGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTA AGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGC CGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACT AATGAACCGTGAGGCTTAACCTT
1221-1228	2	H46c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA

				AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGTTCGCATGCTGGAGGTATCAGAAGTG CGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCG CTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGG GCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTA GTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTG CGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGG TTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATC CGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGT GCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAG CATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGG TCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGA AGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCA CGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAAT CAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACA CAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1280-1290	3	H47	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG

				CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGTTCGCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
1447- 1464	3	H57	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG

				GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCTTCGGTTT AAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAG GCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACA AATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACA TCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAA TACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCA AAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAG GTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATA CCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCA AACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTG CCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTG ATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCC TAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCAC GAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTC AGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGC AAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACT GAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGA AGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCA CCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGT TGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTC CTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCT GGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTT GACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGT CATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAA CGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCC AAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGG CTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGC TGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGT CGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGA ACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGA CGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCC GGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAG CACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAG GGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCG GGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAAT GAACCGTGAGGCTTAACCTT
1490-1499	3	H58e	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT

				CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCTTCGGG AAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCT GAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCAT CAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCA GGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGG AACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGC TGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAG TCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAG CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
1530-1541	3	H59	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA

				GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGTTCGTGAA GCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAG GTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGT AGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAAC TAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGA TATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCG AAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1527-1545	3	H59	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC

				CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACTTCGGCAACAA ATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACAT CAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAAT ACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAA AATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAG GTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATA CCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCA AACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTG CCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTG ATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCC TAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCAC GAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTC AGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGC AAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACT GAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGA AGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCA CCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGT TGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTC CTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCT GGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTT GACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGT CATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAA CGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCC AAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGG CTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGC TGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGT CGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGA ACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGA CGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCC GGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAG CACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAG GGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCG GGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAAT GAACCGTGAGGCTTAACCTT
1720-1740	4	H63b,H63c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG

				CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTTCGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1708- 1750	4	H63a,H63b, H63c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA

				GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGTTCGTCGAAGATACCAGCTGGCTGCAACTGTTTATTA AAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGT GTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTA GCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGG CCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGG GTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCT GTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGA TGCAGTGTACCCGCGGCAAGACGGAAGACCCCGTGAACCT TTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGA TAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGA GCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACG TTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGT TTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCA CGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGC AATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAG CAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATG GAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATA ACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTT TGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTA GGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCG AGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTG CCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACG AGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCA TGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAA GTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGT TCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACG ACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTT GAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1861- 1881	4	H68e,H68f	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA

				TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGTTCGTTGATC GAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAA GGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAA TGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1850-1892	4	H68d,H68e, H68f	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA

				GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGTTCGCCCGGTAAACGGCGGC CGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGG TAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTG TCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGAT GCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTT TACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGAT AGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAG CCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGT TGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTT TGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCAC GAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCA ATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGC AGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATG GAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATA ACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTT TGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTA GGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCG AGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTG CCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACG AGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCA TGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAA GTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGT TCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACG ACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTT GAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1907-1923	4	H69	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG

				TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGTTCG CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2094-2195	5	H76a,H76b, H77a,H77b, H78	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC

				CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGTTCGCTAACGTTGACCCGTAATCCGG GTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTC TCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATC CTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAG CTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAG GTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTC AACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGC CCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTC GGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2471- 2479	PTC	H89c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC

				CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGTTCGCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2550-2558	PTC	H92	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG

				AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGTTCGCATTTAAAGTGGTACGCGAGCTGGGT TTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGC GCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACC GGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT

2648-2672	6	H95	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTTTCGGGACGCATCAC TGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTA AATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAAC TTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGA AGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTA

				AGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGT GAGGCTTAACCTT
2792- 2804	6	H98	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG

				CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGTTCGCCTGAAGGAACGTTGAAGACGACGACGTTGATA GGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGT ACTAATGAACCGTGAGGCTTAACCTT
2855-2862	6	H101d	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA

				GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGTTCGCGTTGAGCTAAC CGGTACTAATGAACCGTGAGGCTTAACCTT
2853- 2864	6	H101d	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC

				TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGTTCGTTGAGCTAACCGGT ACTAATGAACCGTGAGGCTTAACCTT
58-69	1	H6,PK6-7	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACTTCGGATAAGCGTCGGTAAGGTGAT ATGAACCGTTATAACCGGCGATTTCCGAATGGGGAAACCCAG TGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTAATG AGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGA AAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAAC GGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGG AAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGT ACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGG GACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCA AGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGT GAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAA GAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTA GGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTT ATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGA AACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCC GAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGT AACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTA GCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCG GGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCT CGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGG GGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACC GGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGT CCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGT CCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCC AGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAG AAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAG ATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGA CGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGC GAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCG AATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCT CGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGC AGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTC GATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGA AGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTG TCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGG AAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCT GAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCAT CAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCA GGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGG AACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGC TGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAG TCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAG CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC

				TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTTCGC GATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATC ATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACT GAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATT CCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCC TGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCG CGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTG TGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCTG AATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTG ACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAA CCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACG TACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACC TTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTA ACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGG CGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAGC CATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGACC GAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA

				GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
122-129	1	H8	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGTTC GCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTT AATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCG AGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGC GAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTA GTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCC CCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGG CGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCT CCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTAC CGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGA AAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCAC GCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGC GACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGA AGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG

				GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
132-147	1	H9	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCATTCGTATCATTAACTGAATCCATAGGTTAATGAGGC GAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAG AAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGG AGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGC GTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACAC AAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACA CGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGC TAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGG GAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAAC CTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGC GTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATAT TCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAAC CGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAA ACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAAC ACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCG GATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGA GATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGT GAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGG TCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGA GAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCG TCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCC AAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGA CAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAA GCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATG TAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGC TTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAA GGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAAT GCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG

				GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
151-175	1	H10	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATTTCGAGGCGAACCGGG GGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACC GAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCC AGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAA GGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCA CATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATC CTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTC CTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCG AAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACC GTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACT GCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGC AAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTT AACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGT GATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTG GAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTT GTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTG GTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCAT CTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCG ACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTA TCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAG AGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCAT GGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGG ATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAG CTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGC TAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC

				CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
302-315	1	H19	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGTTCGCGCGATACAGGGTGACAGCCCCGTACA CAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGAC ACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGG CTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAG GGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAA CCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGG CGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATA TTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAA CCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGA AACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAA CACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGC GGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGG AGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCG TGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGG GTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGG AGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCC GTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCC CAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAG ACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAA AGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGAT GTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACG CTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGA AGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAA TGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC

				TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
296-342	1	H18b,H19,PK19-20,H20	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTTCGCAAAAATGCACATGCTGTGAGCTCGATGAGTAGG GCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATC CTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGT ACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGT GAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCA CGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAG CGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCG AAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTAT AGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGG TTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAA AAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCA AACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAG CGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGC AAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAA TACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTA ACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTA AGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAG GCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTT AAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCG GAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCA GCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAG CCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAA GTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGC CCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCG GGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCG TAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTAC TGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGAC GGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAA TCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACG GTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTA AGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGT GGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGT GAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGG CACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGA AATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAA CACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGA CGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGC AAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGT AACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAA GTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCT CCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCA

				GTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTAC TATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
380-394	1	H21	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGTTCGTGTCTGAATATGGGGGGACCATCCTCCAAGGC TAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGG GAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAAC CTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGC GTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATAT TCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAAC CGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAA ACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAAC ACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCG GATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGA GATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGT GAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGG TCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGA GAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCG TCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCC AAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGA CAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAA GCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATG TAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGC TTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAA GGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAAT GCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA

				CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
407-420	1	H22	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGTTCGCAAGG CTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAG GGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAA CCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGG CGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATA TTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAA CCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGA AACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAA CACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGC GGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGG AGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCG TGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGG GTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGG AGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCC GTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCC CAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAG ACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAA AGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGAT GTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACG CTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGA AGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAA TGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA

				AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
485-495	1	H24	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACTTCGGAGTGAAAAA GAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTA GGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTT ATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGA AACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCC GAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGT AACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTA GCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCG GGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCT CGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGG GGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACC GGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGT CCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGT CCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCC AGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAG AAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAG ATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGA CGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGC GAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCG AATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCT CGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGC AGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTC GATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGA AGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTG TCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGG AAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCT GAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCAT CAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCA GGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGG AACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGC TGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAG TCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAG

				CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
534-559	0	H25a,H25b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTTCGCG TACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAG GTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACT GGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATC TAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAG GACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTG GCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTT CTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTC CGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACT TACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCA CGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGG GAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTT AAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGT TGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTC ACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAA ACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTT GGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTG AGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGT AACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAA GGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACC CCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGT TAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAG AAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCG TGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGA GGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGC CCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAA TCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCA AGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATG GTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGA

				GGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAG CTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACAC GAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGA AGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGA AGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGG TAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATG GCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGA AATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGAC GGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACA TTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGT GGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTT TAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCG GACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCT AAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTC GGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
567-574	0	H25a	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTCGATGGGTCAGCG ACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAA GGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAG ACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTT GGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAA ATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAA CCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCG CCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAA GGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATA CCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAAC GTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAG GTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGC CCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAA AGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGA AGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGC GACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCT GCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTG CGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCG CTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGG GCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTA GTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTG CGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGG TTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATC CGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGT GCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAG CATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGG

				TCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGA AGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCA CGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAAT CAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACA CAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
605-623	2	H28a,H28b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGTTCGCGAAGGGAAACCGAG TCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCC GGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAA CTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGA CTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAG CTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATT CATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATC CCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATG TTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTG AAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGT CATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCC AGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTA ATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACG GGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATG CGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTG TGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTG ACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGG AAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTG AGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGG AAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGG GGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGG TTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATC AAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCA

				ACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTA ACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGA GAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAG GCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATAT GTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAA GATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGT GCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCG GTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCT CTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACG GTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCT GCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAG ACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCG CGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGA CACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCT TTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAAT ACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCC GGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGG TCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAA TCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
639-649	2	H31	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTTCGCGTTAAGTTGCAGGGTATAGAC CCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGG GTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAAT TAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAAC CGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGC CTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAG GGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATAC CGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACG TCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGG TCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCC CAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAA GAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAA GATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCG ACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTG CGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGC GAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGC TCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGG CAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGT CGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGC GAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGT

				TGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCC GGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTG CTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGC ATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGT CAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAA GGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCAC GCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATC AGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACA GCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGC CTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAG CGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAAC TATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTT CCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCC ACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGT GTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTA TAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGT GGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGA CCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGAC CCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGAC TGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAG GTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGG CATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGT GCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
701-731	2	H34a,H34b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGTTCGC GAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA

				TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
739-757	2	H35b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGTTCGCGGAT GACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGAT AGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAA TTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCAT CCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAAT GTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGT GAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAG TCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGC CAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGT AATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAAC GGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTAT GCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGT GTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCT GACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCG

				GAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGT GAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGG GAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGG GGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCG GTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAAT CAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGC AACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGT AACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAG AGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTA GGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATA TGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGA AGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
823-834	2	H37	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGTTCGCGCCTC GTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGG GGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCG GAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTC CGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTC CCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCA GACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGA AAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGA TGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGAC GCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCG

				AAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGA ATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
863-914	2	H38d,H38e, H38f,H38g, H38h	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGTTCGCGAATACC GGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGT CCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGT CCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCC AGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAG AAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAG ATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGA

				CGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGC GAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCG AATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCT CGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGC AGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTC GATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGA AGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTG TCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGG AAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCT GAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCAT CAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCA GGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGG AACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGC TGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAG TCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAG CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
951-966	2	H39	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGTTCGTCG TGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAA GTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAG CCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCG

				TAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAAC GGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTAT GCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGT GTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCT GACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCG GAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGT GAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGG GAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGG GGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCG GTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAAT CAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGC AACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGT AACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAG AGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTA GGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATA TGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGA AGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
977-986	2	H40	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGTTCGCAGACCGCCAGCTAAGG

				TCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCC CAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAA GAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAA GATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCG ACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTG CGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGC GAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGC TCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGG CAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGT CGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGC GAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGT TGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCC GGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTG CTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGC ATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGT CAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAA GGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCAC GCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATC AGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACA GCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGC CTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAG CGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAAC TATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTT CCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCC ACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGT GTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTA TAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGT GGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGA CCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGAC CCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGAC TGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAG GTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGG CATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGT GCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1063-1075	2	H43b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC

				GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGTTCGCATCATTTAAAGAAA GCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATG TAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGC TTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAA GGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAAT GCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
1088- 1101	2	H44a	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT

				AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGTTCGCACTGGTCGAGTCGGCCTGCGCGGAAGATGT AACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCT TATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAG GTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATG CTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCC GGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGG TGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATG GGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGG GGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCC GGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAA TCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAG CAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGG TAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTA GAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACT AGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGAT ATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCG AAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1165-1184	2	H45a,H45b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG

				AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CTTCGGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTG CTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGAC ATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAA GACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAG TCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAA ACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGG ACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTT TAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAA GGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAAC AAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAAC ATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGA ATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGC AAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTA GGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGAT ACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGC AAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGT GCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTT GATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTC CTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCA CGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACT CAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGG CAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACAC TGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTG AAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACC ACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGG TTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCT CCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCC TGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCT TGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGG TCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCA ACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCC CAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCG GCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATG GCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAAC GTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGA GAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTG GACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGC CCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTA AGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTA AGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGC CGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACT AATGAACCGTGAGGCTTAACCTT
1207-1239	2	H46b,H46c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG

				TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GTTCGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAA GCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTG TCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCG AGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCT GTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATG TTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTG GTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATG ACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCA GGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCA AACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTG AGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAA CTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCG CGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCA ACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGA CGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATT GATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGG TAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAAT TCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
1277-1293	3	H47	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC

				AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAATTCGTCGCCGGA AGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGA GTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGA AACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGG GACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGT TTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCA AGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAA CAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAA CATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAG AATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGG CAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGT AGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGA TACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTG CAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGG TGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCT TGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGT CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1315-1337	3	H50a,H50b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA

				GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCTTCGGGTGAGTCGAC CCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGG TTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGA GAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGC GTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTG AGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAATG CCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAA ATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACC AAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAAT GGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTG AGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCA GCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAAC ACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCG GAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATC GAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAA GGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAA TGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1356- 1375	3	H52b,H52c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA

				TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGTTCGCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1386- 1401	3	H53	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA

				GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAATTCGTACTTGGTGTTACTGCGAAGGGG GGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGG TTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATC AAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCA ACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTA ACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGA GAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAG GCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATAT GTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAA GATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGT GCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCG GTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCT CTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACG GTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCT GCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAG ACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCG CGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGA CACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCT TTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAAT ACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCC GGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGG TCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAA TCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1446-1465	3	H57	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG

				AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGTTCGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1469- 1523	3	H58b,H58c, H58d,H58e	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA

				GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTTTCGGACGAGGCACTACGGTGCTGAA GCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAG GTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGT AGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAAC TAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGA TATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCG AAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1527-1545	3	H59	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG

				AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACTTCGGCAACAA ATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACAT CAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAAT ACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAA AATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAG GTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATA CCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCA AACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTG CCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTG ATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCC TAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCAC GAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTC AGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGC AAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACT GAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGA AGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCA CCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGT TGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTC CTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCT GGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTT GACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGT CATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAA CGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCC AAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGG CTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGC TGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGT CGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGA ACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGA CGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCC GGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAG CACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAG GGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCG GGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAAT GAACCGTGAGGCTTAACCTT

1612-1619	3	H49a	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACTTCGGTGGT CAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAA GGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCAC GCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATC AGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACA GCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGC CTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAG CGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAAC TATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTT CCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCC ACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGT GTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTA TAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGT GGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGA CCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGAC CCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGAC TGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAG GTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGG CATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGT GCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG

				ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1628-1638	3	H60	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGTTCGCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA

				GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
1683-1705	4	H62	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTTCGCGCTGATATGTAGGTGA GGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAG CTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACAC GAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGA AGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGA AGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGG TAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATG GCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGA AATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGAC GGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACA TTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGT GGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTT TAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCG GACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCT AAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTC GGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC

				ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
1708-1750	4	H63a,H63b, H63c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGTTCGTCGAAGATACCAGCTGGCTGCAACTGTTTATTA AAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGT GTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTA GCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGG CCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGG GTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCT GTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGA TGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCT TTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGA TAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGA GCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACG TTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGT TTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCA CGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGC AATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAG CAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATG GAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATA ACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTT TGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTA GGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCG AGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTG

				CCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACG AGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCA TGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAA GTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGT TCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACG ACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTT GAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1777-1787	4	H65	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTCGCACAG CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA

				AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
1805-1812	4	H66b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACTTCGGGACGTATACGGTGTGACGC CTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAG CGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAAC TATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTT CCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCC ACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGT GTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTA TAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGT GGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGA CCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGAC CCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGAC TGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAG GTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGG CATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGT GCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG

				GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1838-1902	4	H68b,H68c,H68d,H68e,H68f	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCTTCGGGCGGCCGTAACTATAACGGTCCTAAGGT AGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGG CGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAA TTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACG GGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACAT TGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTG GACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTT AATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGG ACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTA AAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCG GACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTG CGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGT GATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGAT

				AAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAG TTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCAT CACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTC GCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGA GACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGA GGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCAT CACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAG CTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGA AACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCC TGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGT GTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACC GTGAGGCTTAACCTT
1907-1923	4	H69	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGTTCG CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA

				GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1946- 1960	4	H71	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTTCGCCTG CACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGA CTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGC GGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGAC ACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTT TGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT

				CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2028- 2035	0	H72	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTTCGCAGTG TACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATA GCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGG GAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACC

				TTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCC GTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTG GGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGT TGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCA TAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2094- 2195	5	H76a,H76b, H77a,H77b, H78	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA

				CTATAGCTTGACACTGTTCGCTAACGTTGACCCGTAATCCGG GTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTC TCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATC CTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAG CTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAG GTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTC AACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGC CCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTC GGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2201-2222	5	H79a,H79b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA

				CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACTTCG GGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTC CTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGT CGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGAC TGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
2247-2257	PTC	H80	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC

				TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG TTCGCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGG CTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAA GCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGA AAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCC ATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGA TACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTC GATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAG GGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTT TAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGC GCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACC GGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2265-2275	5	H81	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG

				TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTTCGGGAGGAGCACGAAGGTTGG CTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAA GCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGA AAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCC ATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGA TACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTC GATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAG GGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTT TAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGC GCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACC GGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2301-2315	5	H84	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG

				ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCTTCGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2324-2331	5	H85,PK85	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG

				AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTTCGCA TAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2354-2363	5	H86b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG

				TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGTTCGCGAGCAGGTGCGA AAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCC ATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGA TACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTC GATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAG GGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTT TAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGC GCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACC GGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2373-2380	5	H87	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAGCCTCT

				AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTTTCGAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGC CATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTG ATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCT CGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAA GGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGT TTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGC GCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACC GGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
2396- 2420	5	H88a,H88b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA

				ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCTTCGGCTCAACGGATAA AAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTT CATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCA CATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCG CCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAG ACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAG GGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATC ACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGC TAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAA ACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCT GAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTG TAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCG TGAGGCTTAACCTT
2462-2488	PTC	H89b,H89c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA

				CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATATTCGTGTTTGGCACCTCGATGTCGGCTCATCACA TCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCC ATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGAC AGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGG GGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCAC TGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTA AATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAAC TTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGA AGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTA AGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGT GAGGCTTAACCTT
2524-2539	PTC	H91b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC

				GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGTTCGCAAGGGTATG GCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAAC GTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGA GAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTG GACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGC CCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTA AGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTA AGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGC CGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACT AATGAACCGTGAGGCTTAACCTT
2548- 2560	PTC	H92	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA

				AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATTCGTTTAAAGTGGTACGCGAGCTGGGTTTAG AACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCT GGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGA GTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCAC TGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCAT CTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCT TTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAG GCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTA CTAATGAACCGTGAGGCTTAACCTT
2589-2605	PTC	H93a,H93b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG

				CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGTTCGCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
2647-2673	6	H95	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTCAGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGTAAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA

				TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTTCGGACGCATCACTG GTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAA TGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTT GCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAG GAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAG CGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGA GGCTTAACCTT
2695-2714	6	H96c,H96d	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG

				CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTCGCCCGG TAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCA CGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGG TCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGG TGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGA ACCGTGAGGCTTAACCTT
2744-2760	6	H97b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC

				GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTTT CGACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAA GGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCC GGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTA ATGAACCGTGAGGCTTAACCTT
2792-2804	6	H98	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT

				AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGTTCGCCTGAAGGAACGTTGAAGACGACGACGTTGATA GGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGT ACTAATGAACCGTGAGGCTTAACCTT
2818-2828	6	H100	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG

				AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTTCGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
2847-2869	6	H101c,H101d	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTCAGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGTAAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG

				TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTTCGCTAACCGGTACTAATGAACC GTGAGGCTTAACCTT
55-115	1	H5,H6,PK6-7,H7a,H7b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGTTCGCGAATGGGGAAACCCAGTGTGTTT CGACACACTATCATTAACTGAATCCATAGGTTAATGAGGCGAA CCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAAT CAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCA GCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTG GAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAA TGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGG TATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAAT ACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAG GCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAA ACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTG ACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGT AGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGT

				CTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCG GTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAAC TGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGAC TTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGC TGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTC ATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCC CGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGT TATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGA AGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTC ATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCA GGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAA TAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGG GGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGC GTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGT GCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGA CATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGA AGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGA GTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGA AACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGG GACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGT TTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCA AGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAA CAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAA CATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAG AATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGG CAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGT AGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGA TACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTG CAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGG TGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCT TGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGT CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
122-129	1	H8	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGTTC GCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTT AATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCG AGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGC GAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTA GTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCC CCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGG CGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCT CCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTAC CGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGA AAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCAC

				GCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGC GACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGA AGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGG TGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAG GGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAG GCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGC ACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTC CCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCT GGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGT GGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
236-261	1	H13a,H13b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTTTCGAGCAGCCCAGAG CCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCG CGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATG CTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGT CTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGA CTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAA

				GAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGT ACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGT ACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGG TTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTG GGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTA GCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGA CCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGC TGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCT CCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCG GGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTA CCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACG GGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGA AACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAA GTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTG GCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACT GGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACC ATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGG TAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGG CATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAAC GATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGG TTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTA AGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAAT ATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAG GCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGT AGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
270-369	1	H16,H18a,H18b,H19,PK19-20,H20	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCTTCGGAGTAGGGCGGACACG TGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTA AATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGA

				AAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCT GAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGT GTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTC TGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCG AGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAAC CCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACT AACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGAT GACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGAT AGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAA TTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCAT CCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAAT GTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGT GAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAG TCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGC CAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGT AATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAAC GGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTAT GCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGT GTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCT GACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCG GAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGT GAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGG GAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGG GGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCG GTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAAT CAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGC AACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGT AACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAG AGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTA GGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATA TGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGA AGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
376-398	1	H21	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA

				GTTCGTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTC CTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCG AAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACC GTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACT GCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGC AAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTT AACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGT GATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTG GAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTT GTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTG GTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCAT CTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCG ACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTA TCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAG AGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCAT GGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGG ATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAG CTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGC TAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
482-508	1	H24	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG

				TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGTTCGCCTGAAACCGTGT ACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGT ACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGG TTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTG GGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTA GCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGA CCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGC TGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCT CCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCG GGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTA CCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACG GGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGA AACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAA GTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTG GCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACT GGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACC ATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGG TAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGG CATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAAC GATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGG TTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTA AGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAAT ATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAG GCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGT AGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
565-576	0	H25a	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC

				CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACTTCGGGGTCAGCGACTT ATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGA AACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCC GAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGT AACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTA GCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCG GGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCT CGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGG GGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACC GGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGT CCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGT CCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCC AGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAG AAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAG ATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGA CGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGC GAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCG AATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCT CGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGC AGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTC GATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGA AGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTG TCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGG AAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCT GAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCAT CAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCA GGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGG AACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGC TGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAG TCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAG CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
737-759	2	H35a,H35b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG

				AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACTTCGGATGACTT GTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTG GTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCAT CTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCG ACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTA TCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAG AGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCAT GGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGG ATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAG CTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGC TAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT

776-790	2	H35.1	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGTTCGCAAACCGGGAG ATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTG AATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGT CATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAG AATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGT CGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCA AAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGAC AGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAG CGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGT AACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCT TATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAG GTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATG CTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCC GGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGG TGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATG GGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGG GGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCC GGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAA TCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAG CAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGG TAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTA GAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACT AGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGAT ATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCG AAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG

				CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
852-925	2	H38c,H38d, H38e,H38f, H38g,H38h	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTTCGGAATGTTATCACGGGAGAC ACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAAC CCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGG AAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTA GAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTC GAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGC ACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGG GGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATG CTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATA AAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCC TGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGG CGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTC CTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTA TGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGC TGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGA TGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTC CAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCC CAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCT TGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGT AACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCT CGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTG CAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTG GACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAA TTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCC GGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGA AATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAA TGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAA CTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAG ACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCC TTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCC AGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTT GATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGT CTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTA ACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCA GGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCG TGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCG GTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGT ACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATC GACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCT GGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTA AAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTC GGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCT GCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTG TTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGC GGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCC CCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAA

				CGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGC AGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCT TAACCTT
947-970	2	H39	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACTTCGGAAGAG GGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGG TTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGAT GTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGC TCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCT AAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTG TTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTG TGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAA GTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACC AAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGA CCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAG GTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGG AGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAG CGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCT GAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAAT GCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCA AATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATAC CAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAA TGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG

				GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1052-1107	2	H42d,H43a, H43b,H44a	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGTTCGTCGAGTCGGCCTGCGCGGAAGATGT AACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCT TATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAG GTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATG CTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCC GGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGG TGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATG GGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGG GGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCC GGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAA TCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAG CAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGG TAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTA GAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACT AGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGAT ATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCG AAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACT GTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCC CGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAG CTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAAC GGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACC TGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGA GACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCC GCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTG ACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGC TTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAA TACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATC CGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT

				GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1199-1246	2	H46a,H46b, H46c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTTCGAG TGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCC CGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCG GGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCG TAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTAC TGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGAC GGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAA TCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACG GTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTA AGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGT GGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGT GAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGG CACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGA AATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAA CACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGA CGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGC AAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGT AACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAA GTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCT CCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCA GTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTAC TATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG

				TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1350-1381	3	H52a,H52b, H52c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCTTCGGAAACAGGTTAATATTCCT GTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATG TTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTG GTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATG ACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCA GGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCA AACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTG AGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAA CTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCG CGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCA ACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGA CGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATT GATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGG TAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAAT TCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA

				GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
1443-1548	3	H56c,H57,H58a,H58b,H58c,H58d,H58e,H59	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTTCGACAAATGC CCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAA TCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCA AGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATG GTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGA GGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAG CTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACAC GAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGA AGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGA AGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGG TAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATG GCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGA AATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGAC GGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACA TTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGT GGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTT TAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCG GACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCT AAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTC GGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT

				CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
1836-1904	4	H68a,H68b, H68c,H68d, H68e,H68f	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGTTCGCGGCCGTAACTATAACGGTCCTAAGGTAGCG AAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTA ATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGA ACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAA GACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAG CCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACG CCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATG TTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAG TGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGA GTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACA TCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAG CGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATC CGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT

				CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
1934- 1966	4	H71	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGTTCGCGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT

				CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
2024-2039	0	H72	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCTTCGGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA

				GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2090-2229	PTC	H76a,H76b,H77a,H77b,H78,H79a,H79b,H75c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACTTCGGTCTGGTGGGTAGTTTGACTGGGGCG GTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTA ATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCC AGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGC

				AGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGC TCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2260-2280	5	H81	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTTTCGAGCACGAAGGTTGGCTAATCCTGGT

				CGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGAC TGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
2298-2320	5	H84	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG

				ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTATTCGTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
2348-2369	5	H86a,H86b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG

				GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTTCGGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
2456-2495	PTC	H89a,H89b, H89c	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC

				AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGTTCGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAA GTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTAC GCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTAT CTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGT ACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTG TCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGAT AAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGA GTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGA CGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCG TTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
2521-2544	PTC	H91a,H91b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC

				TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCTTCGGTATGGCTGTTCG CCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAG ACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAG GGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATC ACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGC TAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAA ACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCT GAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTG TAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCG TGAGGCTTAACCTT
2692- 2717	6	H96c,H96d	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG

				TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCTTCGGGTAGCTA AATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAAC TTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGA AGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTA AGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGT GAGGCTTAACCTT
2736-2768	6	H97a,H97b	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG

				ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGTTCGTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
2816-2830	6	H100	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG

				AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACTTCGGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
2840-2877	6	H101b,H101c,H101d	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG

				TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGTTCGTACTAATGAACCGTGAGGCTTAACCTT
0-0	WT	WT	WT	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG

				TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAG GTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAA GGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACA GGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGG CACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGT CCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGC TGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCG TGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGA GGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGC CAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTG CTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCT CCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACG ACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAG CTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	GCAGA C	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGGCAGA CCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTA TCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAA CTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGA TTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAG CCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCG CGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATG CTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGT CTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGA CTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAA GAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGT ACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGT ACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGG TTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTG GGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTA GCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGA CCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGC TGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCT CCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCG GGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTA CCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACG GGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGA AACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAA GTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTG GCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACT GGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACC ATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGG TAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGG CATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAAC GATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGG TTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTA AGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAAT ATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAG GCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGT AGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT

				GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	GCUAAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGGCTAA CCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTA TCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAA CTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGA TTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAG CCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCG CGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATG CTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGT CTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGA CTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAA GAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGT ACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGT ACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGG TTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTG GGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTA GCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGA CCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGC TGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCT CCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCG GGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTA CCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACG GGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGA AACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAA GTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTG GCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACT GGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACC ATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGG TAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGG CATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAAC GATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGG TTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTA AGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAAT ATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAG GCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGT

				AGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	GCGGAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGGCGGA CCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTA TCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAA CTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGA TTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAG CCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCG CGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATG CTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGT CTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGA CTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAA GAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGT ACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGT ACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGG TTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTG GGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTA GCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGA CCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGC TGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCT CCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCG GGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTA CCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACG GGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGA AACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAA GTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTG GCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACT GGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACC ATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGG TAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGG CATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAAC GATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGG TTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTA AGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAAT

				ATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAG GCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGT AGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	UUCCU G	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTTCCTG CGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT

				TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	GCCGAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGGCCGA CCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTA TCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAA CTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGA TTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAG CCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCG CGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATG CTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGT CTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGA CTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAA GAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGT ACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGT ACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGG TTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTG GGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTA GCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGA CCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGC TGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCT CCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCG GGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTA CCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACG GGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGA AACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAA GTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTG GCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACT GGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACC ATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGG TAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGG

				CATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAAC GATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGG TTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTA AGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAAT ATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAG GCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGT AGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
366-423	1	H21,H22,H16	UCGGAGGU	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCACCGAGCCTGAATCAGTGTGTGT GTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGAC AGCCCCGTACACAAAAATGCACATGCTGTGAGCTTCGGAGGT GGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTG AGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAG AACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAG GCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTA TATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAA ACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCG AAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTA ACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAG CGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGG GAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTC GTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGG GGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCG GAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTC CGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTC CCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCA GACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGA AAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGA TGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGAC

				GCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCG AAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGA ATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
366-423	1	H21,H22,H16	UCAGGACC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCGGTGAGCCTGAATCAGTGTGTGT GTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGAC AGCCCCGTACACAAAAATGCACATGCTGTGAGCTTCAGGACC GGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTG AGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAG AACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAG GCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTA TATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAA ACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCG AAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTA ACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAG CGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGG GAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTC GTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGG GGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCG GAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTC CGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTC CCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCA GACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGA AAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGA

				TGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGAC GCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCG AAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGA ATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
366-422	1	H21,H22,H16	UCCGGAG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCGACGAGCCTGAATCAGTGTGTGT GTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGAC AGCCCCGTACACAAAAATGCACATGCTGTGAGCTTCCGGAGA GGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTG AGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAG AACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAG GCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTA TATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAA ACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCG AAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTA ACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAG CGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGG GAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTC GTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGG GGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCG GAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTC CGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTC CCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCA GACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGA

				AAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGA TGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGAC GCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCG AAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGA ATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
366-423	1	H21,H22,H16	UCGCAACG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCGAGAGCCTGAATCAGTGTGTGT GTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGAC AGCCCCGTACACAAAAATGCACATGCTGTGAGCTTCGCAACG GGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTG AGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAG AACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAG GCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTA TATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAA ACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCG AAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTA ACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAG CGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGG GAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTC GTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGG GGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCG GAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTC CGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTC CCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCA

				GACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGA AAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGA TGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGAC GCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCG AAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGA ATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTC GCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCA GGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCG ATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAA GGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGT CCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTG AAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATC AGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAG GTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGA ACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCT GATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGT CGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGC ACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
366-423	1	H21,H22,H16	UCGGCGGG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCCGGAGCCTGAATCAGTGTGTGT GTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGAC AGCCCCGTACACAAAAATGCACATGCTGTGAGCTTCGGCGG GGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGT GAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAA GAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTA GGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTT ATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGA AACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCC GAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGT AACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTA GCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCG GGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCT CGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGG GGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACC GGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGT CCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGT

				CCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCC AGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAG AAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAG ATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGA CGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGC GAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCG AATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCT CGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGC AGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTC GATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGA AGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTG TCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGG AAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCT GAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCAT CAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCA GGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGG AACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGC TGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAG TCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAG CACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCT GCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCG AAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTAT AACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCG ACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	CAGAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGCAGAC CGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG

				GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	CUAAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGCTAAC CGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG

				GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	CGGAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGCGGAC CGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT

				GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	UUCCU	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCTTCCTGC GATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATC ATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACT GAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATT CCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCC TGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCG CGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTG TGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCTG AATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTG ACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAA CCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACG TACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACC TTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTA ACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGG CGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAGC

				CATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGACC GAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
78-108	1	H7a,H7b,PK 6-7	CCGAC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGCCGAC CGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT

				AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
131-148	1	H9	GGGCA C	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCgggcacatcaTTAACTGAATCCATAGGTTAATGAGGCGA ACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAA TCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGC AGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCT GGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAA ATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTG GTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAA TACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAA GGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGA

				AACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGT GACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTG TAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAG TCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCC GGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAA CTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGA CTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAG CTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATT CATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATC CCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATG TTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTG AAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGT CATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCC AGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTA ATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACG GGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATG CGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTG TGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTG ACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGG AAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTG AGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGG AAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGG GGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGG TTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATC AAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCA ACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTA ACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGA GAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAG GCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATAT GTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAA GATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGT GCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCG GTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCT CTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACG GTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCT GCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAG ACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCG CGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGA CACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCT TTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAAT ACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCC GGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGG TCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAA TCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
131-148	1	H9	CGCCAG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCcgccagatcaTTAACTGAATCCATAGGTTAATGAGGCGA ACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAA TCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGC AGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCT GGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAA ATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTG GTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAA

				TACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAA GGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGA AACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGT GACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTG TAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAG TCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCC GGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAA CTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGA CTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAG CTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATT CATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATC CCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATG TTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTG AAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGT CATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCC AGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTA ATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACG GGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATG CGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTG TGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTG ACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGG AAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTG AGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGG AAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGG GGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGG TTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATC AAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCA ACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTA ACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGA GAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAG GCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATAT GTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAA GATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGT GCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCG GTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCT CTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACG GTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCT GCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAG ACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCG CGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGA CACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCT TTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAAT ACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCC GGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGG TCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAA TCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
131-148	1	H9	CGCAAG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCcgcaagatcaTTAACTGAATCCATAGGTTAATGAGGCGA ACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAA TCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGC AGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCT GGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAA

				ATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTG GTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAA TACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAA GGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGA AACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGT GACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTG TAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAG TCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCC GGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAA CTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGA CTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAG CTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATT CATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATC CCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATG TTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTG AAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGT CATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCC AGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTA ATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACG GGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATG CGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTG TGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTG ACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGG AAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTG AGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGG AAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGG GGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGG TTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATC AAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCA ACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTA ACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGA GAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAG GCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATAT GTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAA GATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGT GCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCG GTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCT CTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACG GTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCT GCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAG ACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCG CGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGA CACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCT TTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAAT ACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCC GGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGG TCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAA TCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
131-148	1	H9	GGCCGC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCggccgcatcaTTAACTGAATCCATAGGTTAATGAGGCGA ACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAA TCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGC

				AGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCT GGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAA ATGCACATGCTGTGAGCTCGATGAGTAGGGCGGACACGTG GTATCCTGTCTGAATATGGGGGACCATCCTCCAAGGCTAAA TACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAA GGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGA AACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGT GACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTG TAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAG TCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCC GGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAA CTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGA CTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAG CTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATT CATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATC CCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATG TTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTG AAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGT CATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCC AGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTA ATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACG GGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATG CGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTG TGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTG ACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGG AAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTG AGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGG AAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGG GGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGG TTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATC AAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCA ACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTA ACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGA GAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAG GCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATAT GTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAA GATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGT GCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCG GTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCT CTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACG GTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCT GCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAG ACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCG CGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGA CACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCT TTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAAT ACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCC GGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGG TCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAA TCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
131-148	1	H9	GGCCA C	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCGGCCACATCATTAACTGAATCCATAGGTTAATGAGG

				CGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAA GAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGG GAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAG CGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACA CAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGAC ACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGG CTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAG GGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAA CCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGG CGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATA TTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAA CCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGA AACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAA CACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGC GGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGG AGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCG TGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGG GTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGG AGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCC GTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCC CAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAG ACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAA AGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGAT GTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACG CTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGA AGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAA TGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGC TTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGA GGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTT GAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGT AATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGG GGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTT GGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCAT AAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGC GAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGG CCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCT GATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACC TCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCA AGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGG TTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGG CGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGAC CGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
376-398	1	H21	CGCAA G	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT

				AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GCGCAAGTGAATATGGGGGGACCATCCTCCAAGGCTAAATAC TCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGG CGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAA CCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGA CTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTA GCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTC TTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGG TGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACT GGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACT TGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCT GGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCA TCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCC GACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTT ATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAA GAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCA TGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAG GATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATA GCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGG CTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT

377-397	1	H21	CUGA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTCAGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGTAAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGCTGACTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG

				GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
376-398	1	H21	CGUAA G	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GCGTAAGTGAATATGGGGGGACCATCCTCCAAGGCTAAATAC TCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGG CGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAA CCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGA CTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTA GCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTC TTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGG TGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACT GGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACT TGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCT GGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCA TCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCC GACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTT ATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAA GAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCA TGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAG GATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATA GCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGG CTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC

				ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
376-398	1	H21	CCCGCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GCCCGCGTGAATATGGGGGGACCATCCTCCAAGGCTAAATA CTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAG GCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAA ACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTG ACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGT AGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGT CTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCG GTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAAC TGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGAC TTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGC TGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTC ATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCC CGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGT TATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGA AGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTC ATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCA GGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAA TAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGG GGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGC GTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGT GCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGA CATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGA AGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGA GTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGA AACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGG GACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGT TTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCA AGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAA CAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAA CATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAG AATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGG CAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGT AGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGA TACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTG CAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGG TGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCT TGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGT CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT

				GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
376-398	1	H21	CCCGC G	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GCCCGCGTGAATATGGGGGGACCATCCTCCAAGGCTAAATA CTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAG GCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAA ACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTG ACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGT AGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGT CTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCG GTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAAC TGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGAC TTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGC TGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTC ATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCC CGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGT TATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGA AGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTC ATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCA GGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAA TAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGG GGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGC GTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGT GCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGA CATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGA AGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGA GTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGA AACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGG GACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGT TTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCA AGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAA CAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAA CATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAG AATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGG CAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGT AGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGA TACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTG CAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGG TGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCT TGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGT CCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGC ACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGAC TCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCG GCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACA CTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTT GAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATA CCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCG GGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGT CTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAAT CCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCA GCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCA GGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCT CAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCG CCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGT CGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTAT GGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAA

				CGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGG AGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGT GGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTG CCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCT AAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTT AAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGG CCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTAC TAATGAACCGTGAGGCTTAACCTT
1204-1242	2	H46b,H46c	UCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCtgttcgc aGAAGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAA AAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTT AATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAA GGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGT GTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGG CGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGG CAAATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCAC TACGGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCC TCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGACAC AGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTC GGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAG AAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAG CTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTA AAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGT GTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTA GCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGG CCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGG GTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCT GTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGA TGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCT TTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGA TAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGA GCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACG TTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGT TTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCA CGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGC AATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAG CAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATG GAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATA ACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTT TGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTA

				GGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCG AGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTG CCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACG AGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCA TGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAA GTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGT TCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACG ACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTT GAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1467-1469;1520-1545	3	H58a,H59,H58b	AAG;CC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTatgttggccGGGCGACGG TTGTCCCggtaagagcgtgtaGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTgaggcgccgcaacaaATGCCCTGCTTCCAGGAAAA GCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGA CACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAA CTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGG GAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATG GAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTT ATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATA CGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGG GTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACG GCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTG TCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCA GGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTG AAGATGCAGTGTACCCGCGGCAAGACGGAAGACCCCGTGA ACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGT AGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCA TGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCT AACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGG GTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGG AGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTA GTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCG CGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCT GAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGG GGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGC

				GGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCT GAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGG TACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCC TATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCT AGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGG TTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGA GATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGA TGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGA AGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGAT GCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCT T
1467-1470;1520-1545	3	H58a,H59,H58b	AACU;CG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTatgttggccGGGCGACGG TTGTCCCggtaactgcgtgtaGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTgaggcgcggcaacaaATGCCCTGCTTCCAGGAAA AGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCG ACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGA ACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCG GGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGAT GGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTT TATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTAT ACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGG GGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAAC GGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTT GTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGC CAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTG TGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGT GAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGT GTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTG CATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTT CTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTG GGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAG GAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGT TAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGG CGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTT

				CTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCG GGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGG CGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGC TGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTG GTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTC CCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTC CTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCG GGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAA GAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGA GATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTT GAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCG ATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAAC CTT
1467-1469;1520-1545	3	H58a,H59,H58b	GCG;CC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTatgttggccGGGCGACGG TTGTCCCggtgcgagcgtgtaGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTgaggcgccgcaacaaATGCCCTGCTTCCAGGAAAA GCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGA CACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAA CTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGG GAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATG GAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTT ATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATA CGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGG GTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACG GCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTG TCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCA GGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTG AAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGA ACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGT AGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCA TGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCT AACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGG GTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGG AGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTA

				GTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCG CGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCT GAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGG GGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGC GGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCT GAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGG TACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCC TATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCT AGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGG TTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGA GATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGA TGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGA AGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGAT GCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCT T
1467-1469;1520-1545	3	H58a,H59,H58b	AAC;CC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTatgttggccGGGCGACGG TTGTCCCggtaacagcgtgtaGGCTGGTTTTCCAGGCAAATCCGGA AAATCAAGGCTgaggcgccgcaacaaATGCCCTGCTTCCAGGAAAA GCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGA CACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAA CTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGG GAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATG GAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTT ATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATA CGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGG GTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACG GCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTG TCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCA GGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTG AAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGA ACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGT AGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCA TGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCT AACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGG

				GTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1467-1470;1520-1545	3	H58a,H59,H58b	ACCG;CU	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTCAGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGTAAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTatgttggccGGGCGACGGTTGTCCCggtaccggcgtgtaGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTgaggcgctgcaacaaATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCA

				TGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCT AACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGG GTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGG AGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTA GTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCG CGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCT GAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGG GGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGC GGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCT GAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGG TACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCC TATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTGCTCCT AGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGG TTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGA GATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGA TGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGA AGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGAT GCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCT T
2350-2367	5	H86a,H86b	GGCCCU	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGtcttaactgggCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG

				TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACtgggccctcaGGTGCGAAAGCAGGTCAT AGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACG GATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAA GAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCT CATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
2352- 2364	5	H86b	U	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGtcttaactgggCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG

				TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACtgcgtgagcaGGTGCGAAAGCAGGTCA TAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACG GATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAA GAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCT CATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
2351- 2366	5	H86b	UCGG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGtcttaactgggCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA

				AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACtgctcgggcaGGTGCGAAAGCAGGTCAT AGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACG GATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAA GAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCT CATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
2350-2367	5	H86a,H86b	GCCGGA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGtcttaactgggCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC

				ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACtggccggacaGGTGCGAAAGCAGGTCA TAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACG GATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAA GAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCT CATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
2352-2367	5	H86b,H86a	CCAGC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGtcttaactgggCGTTAAGTTGCAGGGTATA GACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGT TGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAA AATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAA ACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGC GCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCA AGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAAT ACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAA CGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAA GGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGG CCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTA AAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGG AAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAG CGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCC TGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGT GCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCC GCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGG GGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGT AGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACT GCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACG GTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAAT CCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGG TGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAA GCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTG GTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTG AAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGC

				ACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAA ATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAAC ACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGAC GCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCA AGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTA ACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAG TTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTC CACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAG TGTACCCGCGGCAAGACGGGAAGACCCCGTGAACCTTTACT ATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGG TGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCG ACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGA CCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGA CTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAA GGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATG GCATAAGCCAGCTTGACtgcgccagccaGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
1838- 1902	4	H68b,H68c, H68d,H68e, H68f	AUUCG U	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG

				TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCtgccttcgggcgGCCGTAACTATAACGGTCCTAAGGTAGCG AAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTA ATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGA ACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGGAA GACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAG CCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACG CCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATG TTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAG TGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGA GTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACA TCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAG CGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATC CGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
1838- 1902	4	H68b,H68c, H68d,H68e, H68f	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT

				AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCtgccattcgtggcgGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGG AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
0-0	WT	WT	WT	WT
0-2904	Blank	Blank		
48-120	1	H5,H6,PK6-7,H7a,H7b	GGACG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGGACGGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC

				GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
48-120	1	H5,H6,PK6-7,H7a,H7b	GGUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGGTCGGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA

				GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
48-120	1	H5,H6,PK6-7,H7a,H7b	GGAAG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGGAAGGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG

				CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
48-120	1	H5,H6,PK6-7,H7a,H7b	GGCCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGGCCGGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA

				TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
48-120	1	H5,H6,PK6-7,H7a,H7b	GGGCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGGGCGGGGGAAACCCAGTGTGTTTCGACACACTAT CATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAAC TGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGAT TCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGC CTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGC GCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCT GTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCT GAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACT GACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGA ACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTAC GTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTAC CTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTT AACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGG GCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAG CCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGAC CGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA

				GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
734-761	2	H35a,H35b	UA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGTATGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA

				TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
734-761	2	H35a,H35b	CA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGCATGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA

				GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
734-761	2	H35a,H35b	GU	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGGTTGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG

				TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
734-761	2	H35a,H35b	CG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGCGTGACTTGTGGCT GGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTC CCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGG GGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTAC CAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGG GAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAA ACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAG

				TGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGG CTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTG GTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCA TGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGT AGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGC ATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACG ATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGT TCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
734-761	2	H35a,H35b	UG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGTGTGACTTGTGGCTG GGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCC CCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGG GGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCA ACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGA

				GACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAAC AACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTG GGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCT TAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGG TCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCAT GCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTA GGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCA TGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGA TAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTT CCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAA GGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATA TTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGG CTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTA GGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGC GTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCT GCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCG TACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAG GCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGT GCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGG TCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTG GCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAA AGTGGACGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGG TTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGC CCCGGTAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAG CGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCG TAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATT GAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGA AAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGA GCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGAC GCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAAT GTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACA GTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAG AGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGAC ATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGA GCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGAT CCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAA GGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCAT ATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACAT CCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCA TTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACA GTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGG GGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACT GGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAA ATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACT TGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAA GGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAA GCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTG AGGCTTAACCTT
475-509	1	H24	A	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGACTGAAACCGTGTACGTACAAGCA GTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTATA ATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATA GGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGT TGCAGGGTATAGACCCGAAACCCGGTGATCTAGCCATGGGC AGGTTGAAGGTTGGGTAACACTAACTGGAGGACCGAACCGA CTAATGTTGAAAAATTAGCGGATGACTTGTGGCTGGGGGTGA AAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAG CTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAG

				CACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGAT GCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACAC GGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAG ACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACG ATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGC AGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTC GGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGA AGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGC GTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGA GGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCG GGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCC AACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGG CCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTA CTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTG GCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTT TTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGAC GAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAG GAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAA ACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGA GAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAAC TTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGC GGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAA CTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGA CGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATT GATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGG TAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAAT TCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGAAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
475-509	1	H24	CA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCACTGAAACCGTGTACGTACAAGC AGTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTAT AATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATA GGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGT TGCAGGGTATAGACCCGAAACCCGGTGATCTAGCCATGGGC AGGTTGAAGGTTGGGTAACACTAACTGGAGGACCGAACCGA CTAATGTTGAAAAATTAGCGGATGACTTGTGGCTGGGGGTGA

				AAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAG CTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAG CACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGAT GCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACAC GGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAG ACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACG ATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGC AGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTC GGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGA AGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGC GTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGA GGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCG GGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCC AACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGG CCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTA CTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTG GCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTT TTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGAC GAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAG GAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAA ACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGA GAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAAC TTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGC GGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAA CTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGA CGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATT GATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGG TAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAAT TCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGAAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
683-688;774-794	2	H32b,H35.1	CCGG;GAGG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG

				TATAGACCCGAAACCCGGCCGGAGCCATGGGCAGGTTGAAG GTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGA AAAATTAGCGGATGACTTGTGGCTGAGGCCGGGAGATAGCT GGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCA TCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCC GACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTT ATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAA GAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCA TGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAG GATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATA GCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGG CTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGAAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
683-688;774-794	2	H32b,H35.1	CCGA;GAGG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC

				AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGCCGAAGCCATGGGCAGGTTGAAG GTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGA AAAATTAGCGGATGACTTGTGGCTGAGGCCGGGAGATAGCT GGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCA TCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCC GACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTT ATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAA GAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCA TGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAG GATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATA GCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGG CTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGAAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
683-688;774-794	2	H32b,H35.1	CGGA;GACG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA

				GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGCGGAAGCCATGGGCAGGTTGAAG GTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGA AAAATTAGCGGATGACTTGTGGCTGACGCCGGGAGATAGCT GGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCA TCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCC GACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTT ATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAA GAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCA TGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAG GATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATA GCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGG CTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGAAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
683-688;774-794	2	H32b,H35.1	CCGA;CAGG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA

				TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGCCGAAGCCATGGGCAGGTTGAAG GTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGA AAAATTAGCGGATGACTTGTGGCTCAGGCCGGGAGATAGCT GGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCA TCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCC GACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTT ATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAA GAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCA TGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAG GATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATA GCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGG CTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTT GTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCT GTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATA AGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGAC CAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCG ACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACA GGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACG GAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAA GCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGC TGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAA TGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATC AAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATA CCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAA ATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGT GAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACC AGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAA CACGAAAGTGGACGTATACGGTGTGACGCCTGCCCGGTGCC GGAAGGTTAATTGATGGGGTTAGCGCAAGCGAAGCTCTTGAT CGAAGCCCCGGTAAACGGCGGCCGTAACTATAACGGTCCTA AGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGA ATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGT GAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAG ACGGAAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAA CATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGT GTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACC CTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTG CGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCT CCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTG GTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTG ACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTC ATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAAC GGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCA AGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGC TCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCT GTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTC GTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAA CTGAGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGAC GCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCG GTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGC ACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGG GTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGG GTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATG AACCGTGAGGCTTAACCTT
2259-2281	5	H81	GACC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA

				GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCGACCGCACGAAGGTTGGCTAATCCTGGTC GGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
2259-2281	5	H81	AACC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG

				AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCAACCGCACGAAGGTTGGCTAATCCTGGTC GGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
2297-2322	5	H84	GCA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA

				GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTGCAGTGCAATGGCATAAGCCAGCTTGACTGCG AGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGA TCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAA AGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTC ATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCAC ATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGC CATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGA CAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGG GGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCA CTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCT AAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAA CTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTG AAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGT AAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGT GAGGCTTAACCTT
2348-2369	5	H86a,H86b	AGGC	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT

				AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACAGGCGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT

2348-2369	5	H86a,H86b	AGCU	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCG CAAGCGAAGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCG TAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTA AGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTC TCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGC AGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTA CTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAG GTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCC GACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTG ACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTG ACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGA AGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAAT GGCATAAGCCAGCTTGACAGCTGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGT AGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCAC GAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGT CCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGT

				GTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAA CCGTGAGGCTTAACCTT
1196- 1250	2	H46a,H46b, H46c	CGCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGCGCGAAT GCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCG CCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAG GGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGA TGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAG GGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTC CCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAA AATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGA AGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCA GGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGG TAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAA CTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTG ATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTC GAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCA CTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTG CCCGGTGCCGGAAGGTTAATTGATGGGGTTAGCGCAAGCGA AGCTCTTGATCGAAGCCCCGGTAAACGGCGGCCGTAACTATA ACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGA CCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCC GAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTAC CCGCGGCAAGACGGAAAGACCCCGTGAACCTTTACTATAGCT TGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAG GCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGA AATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAA TCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGG CGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGG CTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAA GCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGA AAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCC ATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGA TACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTC GATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAG GGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTT TAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGC GCTGGAGAACTGAGGGGGGCTGCTCCTAGTACGAGAGGACC GGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATG GCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAA GCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGA

				CCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTG ATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACC GGTACTAATGAACCGTGAGGCTTAACCTT
1349- 1383	3	H52a,H52b, H52c	GCAG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACGCAGAACAGGTTAATATTCCTGT ACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTT GGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGT TTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGAC GAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAG GAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAA ACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGA GAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAAC TTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGC GGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAA CTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGA CGTATACGGTGTGACGCCTGCCCGGTGCCGGAAGGTTAATT GATGGGGTTAGCGCAAGCGAAGCTCTTGATCGAAGCCCCGG TAAACGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAAT TCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGA TGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTC GCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGAAAGACC CCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTG ATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAG TCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGA TGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCT GGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAAC GGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGG AGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGA CGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTG GTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACT CCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGAC GGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGG GGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAA GTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCG GTCCCTATCTGCCGTGGGCGCTGGAGAACTGAGGGGGGCTG CTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGT TCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCG

				GAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCC CGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAAC GTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCA GCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTT AACCTT
1838- 1902	4	H68b,H68c, H68d,H68e, H68f	GCAA	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTC AGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGT AAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGG AAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATA GGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACC CCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCG AGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTG TTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACA GCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTA GGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCA TCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCA GTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGA GTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAG CACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTC AGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGC CGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGG TATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAA GGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTG AAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAAT CAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGT AGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCG GCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGC GAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTG CTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAG CTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGA AGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCA TTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCG CGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGG CAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAA GCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGA AGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAG CCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATC GGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGC GTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTA CTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGA CGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAA ATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTAC GGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCT AAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGG TGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGG TGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAG GCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTG AAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAA ACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTG ACGCCTGCCCGCAAGGCGGCCGTAACTATAACGGTCCTAAGG TAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATG GCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGA AATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGAC GGAAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACA TTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGT GGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTT TAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCG GACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCT AAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTC GGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACT GCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATA GTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGG ATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGA GTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCA TCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTT CGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTG AGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTG AGGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGC

				ATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT
1838-1902	4	H68b,H68c,H68d,H68e,H68f	UUCG	GGTTAAGCGACTAAGCGTACACGGTGGATGCCCTGGCAGTCAGAGGCGATGAAGGACGTGCTAATCTGCGATAAGCGTCGGTAAGGTGATATGAACCGTTATAACCGGCGATTTCCGAATGGGGAAACCCAGTGTGTTTCGACACACTATCATTAACTGAATCCATAGGTTAATGAGGCGAACCGGGGGAACTGAAACATCTAAGTACCCCGAGGAAAAGAAATCAACCGAGATTCCCCCAGTAGCGGCGAGCGAACGGGGAGCAGCCCAGAGCCTGAATCAGTGTGTGTGTTAGTGGAAGCGTCTGGAAAGGCGCGCGATACAGGGTGACAGCCCCGTACACAAAAATGCACATGCTGTGAGCTCGATGAGTAGGGCGGGACACGTGGTATCCTGTCTGAATATGGGGGGACCATCCTCCAAGGCTAAATACTCCTGACTGACCGATAGTGAACCAGTACCGTGAGGGAAAGGCGAAAAGAACCCCGGCGAGGGGAGTGAAAAAGAACCTGAAACCGTGTACGTACAAGCAGTGGGAGCACGCTTAGGCGTGTGACTGCGTACCTTTTGTATAATGGGTCAGCGACTTATATTCTGTAGCAAGGTTAACCGAATAGGGGAGCCGAAGGGAAACCGAGTCTTAACTGGGCGTTAAGTTGCAGGGTATAGACCCGAAACCCGGTGATCTAGCCATGGGCAGGTTGAAGGTTGGGTAACACTAACTGGAGGACCGAACCGACTAATGTTGAAAAATTAGCGGATGACTTGTGGCTGGGGGTGAAAGGCCAATCAAACCGGGAGATAGCTGGTTCTCCCCGAAAGCTATTTAGGTAGCGCCTCGTGAATTCATCTCCGGGGGTAGAGCACTGTTTCGGCAAGGGGGTCATCCCGACTTACCAACCCGATGCAAACTGCGAATACCGGAGAATGTTATCACGGGAGACACACGGCGGGTGCTAACGTCCGTCGTGAAGAGGGAAACAACCCAGACCGCCAGCTAAGGTCCCAAAGTCATGGTTAAGTGGGAAACGATGTGGGAAGGCCCAGACAGCCAGGATGTTGGCTTAGAAGCAGCCATCATTTAAAGAAAGCGTAATAGCTCACTGGTCGAGTCGGCCTGCGCGGAAGATGTAACGGGGCTAAACCATGCACCGAAGCTGCGGCAGCGACGCTTATGCGTTGTTGGGTAGGGGAGCGTTCTGTAAGCCTGCGAAGGTGTGCTGTGAGGCATGCTGGAGGTATCAGAAGTGCGAATGCTGACATAAGTAACGATAAAGCGGGTGAAAAGCCCGCTCGCCGGAAGACCAAGGGTTCCTGTCCAACGTTAATCGGGGCAGGGTGAGTCGACCCCTAAGGCGAGGCCGAAAGGCGTAGTCGATGGGAAACAGGTTAATATTCCTGTACTTGGTGTTACTGCGAAGGGGGGACGGAGAAGGCTATGTTGGCCGGGCGACGGTTGTCCCGGTTTAAGCGTGTAGGCTGGTTTTCCAGGCAAATCCGGAAAATCAAGGCTGAGGCGTGATGACGAGGCACTACGGTGCTGAAGCAACAAATGCCCTGCTTCCAGGAAAAGCCTCTAAGCATCAGGTAACATCAAATCGTACCCCAAACCGACACAGGTGGTCAGGTAGAGAATACCAAGGCGCTTGAGAGAACTCGGGTGAAGGAACTAGGCAAAATGGTGCCGTAACTTCGGGAGAAGGCACGCTGATATGTAGGTGAGGTCCCTCGCGGATGGAGCTGAAATCAGTCGAAGATACCAGCTGGCTGCAACTGTTTATTAAAAACACAGCACTGTGCAAACACGAAAGTGGACGTATACGGTGTGACGCCTGCCTTCGGGCGGCCGTAACTATAACGGTCCTAAGGTAGCGAAATTCCTTGTCGGGTAAGTTCCGACCTGCACGAATGGCGTAATGATGGCCAGGCTGTCTCCACCCGAGACTCAGTGAAATTGAACTCGCTGTGAAGATGCAGTGTACCCGCGGCAAGACGGAAAGACCCCGTGAACCTTTACTATAGCTTGACACTGAACATTGAGCCTTGATGTGTAGGATAGGTGGGAGGCTTTGAAGTGTGGACGCCAGTCTGCATGGAGCCGACCTTGAAATACCACCCTTTAATGTTTGATGTTCTAACGTTGACCCGTAATCCGGGTTGCGGACAGTGTCTGGTGGGTAGTTTGACTGGGGCGGTCTCCTCCTAAAGAGTAACGGAGGAGCACGAAGGTTGGCTAATCCTGGTCGGACATCAGGAGGTTAGTGCAATGGCATAAGCCAGCTTGACTGCGAGCGTGACGGCGCGAGCAGGTGCGAAAGCAGGTCATAGTGATCCGGTGGTTCTGAATGGAAGGGCCATCGCTCAACGGATAAAAGGTACTCCGGGGATAACAGGCTGATACCGCCCAAGAGTTCATATCGACGGCGGTGTTTGGCACCTCGATGTCGGCTCATCACATCCTGGGGCTGAAGTAGGTCCCAAGGGTATGGCTGTTCGCCATTTAAAGTGGTACGCGAGCTGGGTTTAGAACGTCGTGAGACAGTTCGGTCCCTATCTGCCGTGGGCGCTGGAGAACTGA

				GGGGGGCTGCTCCTAGTACGAGAGGACCGGAGTGGACGCATCACTGGTGTTCGGGTTGTCATGCCAATGGCACTGCCCGGTAGCTAAATGCGGAAGAGATAAGTGCTGAAAGCATCTAAGCACGAAACTTGCCCCGAGATGAGTTCTCCCTGACCCTTTAAGGGTCCTGAAGGAACGTTGAAGACGACGACGTTGATAGGCCGGGTGTGTAAGCGCAGCGATGCGTTGAGCTAACCGGTACTAATGAACCGTGAGGCTTAACCTT