[00011] In some embodiments, structural protein genes can include prM and E genes of DEN-1, DEN-2, DEN-3 or DEN-4 on a DEN-2 backbone having one or two mutations that are part of a live, attenuated dengue virus. For example, a dengue construct, in certain embodiments can include those constructs termed DENVax-1-A, DENVax-2-F, DENVax-3-F, and DENVax-4-F (see Example section) where the DEN-2 backbone has one or more mutations (e.g. not found in the P1 or other previous passaged virus or PDK-53) from the DEN-2 live, attenuated virus previously demonstrated to be safe and effective to induce an immune response. The DEN-2 live, attenuated virus of the instant application is an improved version of the originally used DEN-2 live, attenuated virus. A chimeric construct of the instant ~~invention~~ disclosure can include a modified attenuated DEN-2 PDK-53 backbone, having one or more structural proteins of the second dengue virus serotype wherein the structural proteins can include additional mutations to increase an immunogenic response to the chimeric construct. In some embodiments, certain mutations acquired by attenuated DEN-2 PDK-53 can produce a conservative amino acid change or not in a constructs different from the P1 construct which can result in desirable traits for production etc.

[00012] In other embodiments, a live, attenuated DEN-2 genome can be used to generate constructs of dengue virus serotype 1 (DEN-1) and dengue virus serotype 3 (DEN-3), dengue virus serotype 4 (DEN-4) where one or more structural protein genes of the DEN-2 viral genome can be replaced by one or more structural protein genes of DEN-1, DEN-3 or DEN-4, respectively. In some embodiments, a structural protein can be the C, prM or E protein of a second dengue virus. In certain embodiments, structural protein genes include the prM and E genes of DEN-1, DEN-3 or DEN-4. These hybrid viruses express the surface antigens of DEN-1, DEN-3 or DEN-4 while retaining the attenuation phenotypes of the parent attenuated DEN-2.

[00013] Constructs disclosed herein can include chimeric constructs of DEN-4, DEN-2, DEN-1, and DEN-3 expressing surface antigens of DEN-1, DEN-3 and DEN-4 using attenuated DEN-2 virus as a backbone.

[0013a] In one aspect, there is provided a nucleic acid chimera comprising a nucleic acid sequence encoding a polypeptide comprising a dengue-1/dengue-2 chimera comprising a nucleic acid sequence represented by SEQ ID NO.:1 (Pre-master), SEQ ID NO.3: (MVS), SEQ ID NO.5 (WVS): SEQ ID NO.:7 (BVS) or a combination thereof.

[0013b] In one aspect, there is provided a nucleic acid sequence comprising a nucleic acid sequence encoding a modified live, attenuated dengue-2 virus comprising a nucleic acid sequence represented by SEQ ID NO.:9 (Pre-master), SEQ ID NO.11: (MVS), SEQ ID NO.13 (WVS): SEQ ID NO.:15 (BVS) or a combination thereof.

[0013c] In one aspect, there is provided a nucleic acid chimera comprising a nucleic acid sequence encoding a polypeptide comprising a dengue-3/dengue-2 chimera comprising a nucleic acid sequence represented by SEQ ID NO.:17 (Pre-master), SEQ ID NO.19: (MVS), SEQ ID NO.21 (WVS): SEQ ID NO.:23 (BVS) or a combination thereof.

[0013d] In one aspect, there is provided a nucleic acid chimera comprising a nucleic acid sequence encoding a polypeptide comprising a dengue-4/dengue-2 chimera comprising a nucleic acid sequence represented by SEQ ID NO.:25 (Pre-master), SEQ ID NO.27: (MVS), SEQ ID NO.29 (WVS): SEQ ID NO.:31 (BVS) or a combination thereof.

[0013e] In one aspect, there is provided a nucleic acid dengue-1 chimera comprising nucleic acid sequences represented by SEQ ID NO:7 encoding a mixture of species containing nucleotides C and G at nucleotide position 2384 which encodes a mixture of dengue viral species containing amino acids Gly and Ala at amino acid 483.

[0013f]In one aspect, there is provided a dengue-2 nucleic acid sequence comprising nucleic acid sequences represented by SEQ ID NO:15 encoding a mixture of species containing nucleotides G and C at nucleotide position 6481 which encodes a mixture of dengue viral species containing amino acids Ala and Pro in NS4A-36.

[0013g] In one aspect, there is provided a dengue-2 nucleic acid sequence comprising nucleic acid sequences represented by SEQ ID NO:15 encoding a mixture of species containing nucleotides C and T at nucleotide position 7156 which encodes a mixture of dengue viral species containing Leu and Phe in NS4B-111.

[0013h] In one aspect, there is provided a nucleic acid dengue 4 chimera comprising nucleic acid sequences represented by SEQ ID NO:31 encoding a mixture of species containing nucleotides C and T at nucleotide position 7538 which encodes a mixture of dengue viral species containing Ser and Phe in NS4B-238.

[0013i]In one aspect, there is provided a nucleic acid dengue 4 chimera comprising nucleic acid sequences represented by SEQ ID NO:31 encoding a mixture of species containing nucleotides A and G at nucleotide position 7337 which encodes a mixture of dengue viral species containing Lys and Arg in NS2A-99.

[0013j] In one aspect, there is provided a polypeptide molecule encoded by a nucleic acid sequence encoding a dengue-1/dengue-2 chimera comprising the polypeptide molecule represented by SEQ ID NO: 2 (Pre-master), SEQ ID NO:4 (MVS), SEQ ID NO:6 (WVS), SEQ ID NO.:8 (BVS) or a combination thereof.

[0013k] In one aspect, there is provided a polypeptide molecule encoded by a nucleic acid sequence encoding a live, attenuated dengue-2 virus comprising the polypeptide molecule represented by SEQ ID NO: 10 (Pre-master), SEQ ID NO:12 (MVS), SEQ ID NO:14 (WVS), SEQ ID NO.:16 (BVS) or a combination thereof.

[0013l] In one aspect, there is provided a polypeptide molecule encoded by a nucleic acid sequence encoding a dengue-3/dengue-2 chimera comprising the polypeptide molecule represented by SEQ ID NO: 18 (Pre-master), SEQ ID NO:20 (MVS), SEQ ID NO:22 (WVS), SEQ ID NO.:24 (BVS) or a combination thereof.

[0013m] In one aspect, there is provided a polypeptide molecule encoded by a nucleic acid sequence encoding a dengue-4/dengue-2 chimera comprising the polypeptide molecule represented by SEQ ID NO: 226 (Pre-master), SEQ ID NO:28 (MVS), SEQ ID NO:6 (WVS), SEQ ID NO.:32 (BVS) or a combination thereof.

[0013n] In one aspect, there is provided a live, attenuated dengue-1 chimeric virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:1 (Pre-master), SEQ ID NO.3: (MVS), SEQ ID NO.5 (WVS): SEQ ID NO.:7 (BVS) or a combination thereof, wherein one or more of the nucleic acid sequences are encapsidated.

[0013o] In one aspect, there is provided a live, attenuated dengue-2 virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:9 (Pre-master), SEQ ID NO.11: (MVS), SEQ ID NO.13 (WVS): SEQ ID NO.:15 (BVS) or a combination thereof, wherein one or more of the nucleic acid sequences are encapsidated.

[0013p] In one aspect, there is provided a live, attenuated dengue-3 chimeric virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:17 (Pre-master), SEQ ID NO.19: (MVS), SEQ ID NO.21 (WVS): SEQ ID NO.:23 (BVS) or a combination thereof wherein one or more of the nucleic acid sequences are encapsidated.

[0013q] In one aspect, there is provided a live, attenuated dengue-4 chimeric virus comprising one or more polypeptide sequences encoded from one or more nucleic acid

sequences comprising SEQ ID NO.:25 (Pre-master), SEQ ID NO.27: (MVS), SEQ ID NO.29 (WVS): SEQ ID NO.:31 (BVS) or a combination thereof wherein one or more of the nucleic acid sequences are encapsidated.

[0013r] In one aspect, there is provided a vector encoding a nucleic acid sequence as defined herein.

[0013s] In one aspect, there is provided an isolated cell comprising the nucleic acid sequences as defined herein.

[0013t] In one aspect, there is provided a pharmaceutical composition comprising at least one nucleic acid chimera as defined herein, and a pharmaceutically acceptable excipient.

0013u] In one aspect, there is provided a pharmaceutical composition comprising at least one polypeptide molecule as defined herein, and a pharmaceutically acceptable excipient.

[0013v] In one aspect, there is provided a kit comprising at least one nucleic acid sequence as defined herein; or at least one polypeptide sequence as defined herein or at least one composition as defined herein; and a container.

[00014] In certain embodiments, compositions of the instant ~~invention~~ disclosure can include a composition that comprises a single chimeric dengue virus construct disclosed herein and a pharmaceutically acceptable carrier or excipient. Alternatively, compositions of the instant ~~invention~~ disclosure can include a composition that comprises two or more, or three or more chimeric dengue virus constructs disclosed herein, and a pharmaceutically acceptable carrier or excipient. In accordance with these embodiments, a one or more dengue virus chimeric constructs contemplated herein can be combined with one or more, live attenuated dengue

viruses. In certain embodiments, a live, attenuated virus can be a live, attenuated DEN-2 virus wherein additional mutations in the NCR, NS1 regions or other regions increase the immune response, increase viral growth or other improvement for an improved live, attenuated dengue virus.

[0014a] In one aspect, there is provided an immunogenic composition comprising one or more, live, attenuated dengue viruses having a nucleotide sequence encoding a dengue virus or dengue virus chimera represented by SEQ ID NOS. 1, 3, 5, and 7, for a dengue-1/dengue-2 chimera; SEQ ID NOS. 9, 11, 13, and 15, for a live, attenuated dengue-2 virus; SEQ ID NOS. 17, 19, 21, and 23 for a dengue-3/dengue-2 chimera; and SEQ ID NOS. 25, 27, 29 and 31 for a dengue-4/dengue-2 chimera; and a pharmaceutically acceptable carrier.

[0014b] In one aspect, there is provided the use of any of the compositions as defined herein in the manufacture of a medicament for inducing an immune response in a subject, wherein the medicament induces an immune response to dengue virus in the subject.

[0014c] In one aspect, there is provided the use of a composition or a nucleic acid sequence or live, attenuated dengue virus as defined herein in the manufacture of a vaccine for inducing an immune response to dengue virus.

[00015] In certain embodiments, the attenuation loci, nucleotide 5'NCR-57-T, NS1-53-Asp, and NS3-250-Val, of the DENV-2 vaccine have been previously determined, and all of these changes are shared by the common PDK-53 virus-specific genetic background of the four DENVax viruses. The genetic sequence of the three attenuation loci as well as the previously established *in vitro* and *in vivo* attenuation phenotypes of these vaccine candidates were carefully monitored for the cGMP-manufactured DENVax seeds. This report describes strategies used to generate master virus seeds (MVS) as well as their genetic and phenotypic characterization of use in the manufacture of dengue virus vaccine compositions. These MVS can be used for manufacture of clinical materials and ultimately commercial vaccine supplies.

Brief Description of the Drawings

[00016] The following drawings form part of the present specification and are included to further demonstrate certain embodiments. Some embodiments may be better understood by reference to one or more of these drawings alone or in combination with the detailed description of specific embodiments presented.

[00017] **Fig. 1** represents an exemplary chart reflecting an exemplary chimeric construct of the instant invention, DEN-2/DEN-4 compared to previously generated constructs and wild type dengue viruses.

[00018] **Fig. 2** represents an exemplary histogram plot comparing various responses using a live, attenuated DEN-2 backbone (with additional mutations) and a second dengue virus serotype as structural components substituted for the dengue-2 structural components (e.g. DENVax-1 MVS). This plot illustrates plaque sizes of the DENVax MVS. Wild-type Dengue viruses and previously published research-grade vaccine candidate viruses were included for control and comparison. This plot illustrates improved production of the dengue virus constructs compared to control dengue virus chimeric constructs.

[00019] **Fig. 3** represents an exemplary histogram plot that represents temperature sensitivities of DENVax MVS (Master Virus Seed). Wild type dengue viruses and previously published research-grade vaccine candidate viruses were included for comparison with the MVS grade.

What is claimed:

1. A nucleic acid chimera comprising a first nucleotide sequence encoding nonstructural proteins from a modified live, attenuated dengue-2 virus strain PDK-53, and a second nucleotide sequence encoding at least one structural protein from dengue-1, wherein the live, attenuated dengue-2 virus further comprises at least one additional mutation that includes a mutation at nucleic acid position 3823 wherein amino acid position 116 of NS2A gene is a leucine instead of isoleucine.
2. The nucleic acid chimera of claim 1, wherein the live, attenuated dengue-2 virus further includes a mutation at position 4407 wherein amino acid position 92 of NS2B is aspartic acid instead of glutamic acid.
3. The nucleic acid chimera of claim 1, wherein the live, attenuated dengue-2 virus further includes a mutation at position 7148 wherein amino acid position 108 of NS4B is isoleucine instead of threonine.
4. The nucleic acid chimera of claim 1, wherein the live, attenuated dengue-2 virus further includes a mutation in position 7311.
5. The nucleic acid chimera of claim 1, wherein the second nucleotide sequence encodes the E protein from dengue-1 which further comprises a mutation at position 2384 wherein amino acid position 483 of the E protein is alanine instead of glycine.
6. A pharmaceutical composition comprising a nucleic acid chimera of according to any one of claims 1-5, and a pharmaceutically acceptable excipient.
7. A pharmaceutical composition comprising a polypeptide encoded by a nucleic acid chimera according to any one of claims 1-5, and a pharmaceutically acceptable excipient.
8. A method for inducing an immune response in a subject comprising administering a pharmaceutically acceptable amount of any of the compositions of claims 6 and 7, wherein the composition induces an immune response to dengue virus in the subject.
9. A vector encoding a nucleic acid sequence of any one of claims 1-5.
10. A nucleic acid sequence comprising a nucleic acid sequence encoding a modified live, attenuated dengue-2 virus strain PDK-53, wherein the live,

attenuated dengue-2 virus further comprises at least one additional mutation that includes a mutation at nucleic acid position 6481 wherein amino acid position 36 of NS4A gene is a proline instead of alanine.

11. The nucleic acid sequence of claim 10, wherein the live, attenuated dengue-2 virus further includes a mutation at position 7156 wherein amino acid position 111 of NS4B is phenylalanine instead of leucine .

12. The nucleic acid sequence of claim 10, wherein the live, attenuated dengue-2 virus further includes a mutation at position 8803 wherein amino acid position 412 of NS5 is valine instead of isoleucine .

13. The nucleic acid sequence of claim 1, wherein the live, attenuated dengue-2 virus further includes a mutation at position 592 wherein amino acid position 52 of prM is glutamic acid instead of lysine.

14. A pharmaceutical composition comprising a nucleic acid chimera of according to any one of claims 10-13, and a pharmaceutically acceptable excipient.

15. A pharmaceutical composition comprising a polypeptide encoded by a nucleic acid sequence according to any one of claims 10-13, and a pharmaceutically acceptable excipient.

16. A method for inducing an immune response in a subject comprising administering a pharmaceutically acceptable amount of any of the compositions of claims 14 and 15, wherein the composition induces an immune response to dengue virus in the subject.

17. A vector encoding a nucleic acid sequence of any one of claims 10-13.

18. A nucleic acid chimera comprising a first nucleotide sequence encoding nonstructural proteins from a modified live, attenuated dengue-2 virus strain PDK-53, and a second nucleotide sequence encoding at least one structural protein from dengue-3, wherein the live, attenuated dengue-2 virus further comprises at least one additional mutation that includes a mutation at nucleic acid position 6436 wherein amino acid position 23 of N42A gene is asparagine instead of aspartic acid.

19. The nucleic acid chimera of claim 16, wherein the live, attenuated dengue-2 virus further includes a mutation at position 7620.

20. The nucleic acid chimera of claim 16, wherein the second nucleotide sequence encodes the E protein from dengue-3 which further comprises a mutation at position 1603 wherein amino acid position 223 of the E protein is serine instead of threonine.
21. A pharmaceutical composition comprising a nucleic acid chimera of according to any one of claims 18-20, and a pharmaceutically acceptable excipient.
22. A pharmaceutical composition comprising a polypeptide encoded by a nucleic acid chimera according to any one of claims 18-20, and a pharmaceutically acceptable excipient.
23. A method for inducing an immune response in a subject comprising administering a pharmaceutically acceptable amount of any of the compositions of claims 21 and 22, wherein the composition induces an immune response to dengue virus in the subject.
24. A vector encoding a nucleic acid sequence of any one of claims 18-20.
25. A nucleic acid chimera comprising a first nucleotide sequence encoding nonstructural proteins from a modified live, attenuated dengue-2 virus strain PDK-53, and a second nucleotide sequence encoding at least one structural protein from dengue-4, wherein the live, attenuated dengue-2 virus further comprises at least one additional mutation that includes a mutation at nucleic acid position 3674 wherein amino acid position 66 of NS2A gene is an glycine instead of aspartic acid.
26. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 3773 wherein amino acid position 99 of NS2A is arginine instead of lysine .
27. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 5391.
28. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 6437 wherein amino acid position 21 of NS4A is valine instead of alanine.
29. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 7026.

30. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 7538 wherein amino acid position 238 of NS4B is phenylalanine instead of serine.
31. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 9750.
32. The nucleic acid chimera of claim 22, wherein the live, attenuated dengue-2 virus further includes a mutation at position 225.
33. A pharmaceutical composition comprising a nucleic acid chimera of according to any one of claims 25-32, and a pharmaceutically acceptable excipient.
34. A pharmaceutical composition comprising a polypeptide encoded by a nucleic acid chimera according to any one of claims 25-32, and a pharmaceutically acceptable excipient.
35. A method for inducing an immune response in a subject comprising administering a pharmaceutically acceptable amount of any of the compositions of claims 33 and 34, wherein the composition induces an immune response to dengue virus in the subject.
36. A vector encoding a nucleic acid sequence of any one of claims 25-32.
37. A nucleic acid sequence comprising one or more nucleic acid sequences identified by SEQ ID NOS. 1, 7, and 10.
38. The nucleic acid according to claim 33, wherein the nucleic acid chimera encodes a polypeptide represented by SEQ ID NOS. 2, 3, 8, 9, 11 or 12.
39. An immunogenic composition comprising one or more nucleic acid sequences of claim 37 or polypeptides of claim 38, and a pharmaceutically acceptable carrier.
40. The composition of claim 39, further comprising a live, attenuated dengue-2 virus.
41. The composition of claim 40, wherein the live, attenuated dengue-2 virus is represented by the nucleic acid sequence of SEQ ID NO.4 or the amino acid sequence of one or more of SEQ ID NOS. 5 and 6.
42. The composition of claim 40, wherein the composition contains all four dengue virus serotypes, a tetravalent composition.
43. The composition of claim 39, further comprising an immunogenic composition for a flavivirus selected from the group consisting of yellow fever virus, tick-

borne encephalitis virus, Japanese encephalitis virus, West Nile virus, hepatitis C virus, and a combination of two or more thereof.

44. A kit comprising at least one nucleic acid sequence according to any of claims 1-5, 10-13, 18-20 or 25-32; or at least one composition according to any of claims 6, 7, 14, 15, 21, 22, 33 or 34 and a container.

45. A live, attenuated virus comprising one or more nucleic acid sequences according to any of 1-5, 10-13, 18-20 or 25-32.

46. A nucleic acid sequence or polypeptide encoded by one or more nucleic acid sequences comprising the nucleic acid sequences of Table 3.

47. A nucleic acid sequence or polypeptide encoded by one or more nucleic acid sequences comprising one or more of DENVax-1-A, DENVax-2-F, DENVax-3-F, and DENVax-4-F.

48. A composition comprising one or more nucleic acid sequences or polypeptides encoded by the nucleic acid sequences of claim 47, and a pharmaceutically acceptable carrier or excipient.

49. The composition of claim 48, further comprising a pharmaceutically acceptable adjuvant.

50. A composition comprising one or more live attenuated viruses of claim 45, and a pharmaceutically acceptable carrier.

51. The composition of claim 50, wherein the composition comprises a tetravalent dengue virus composition capable of inducing an immune response in a subject against all four dengue virus serotypes.

What is claimed:

1. A nucleic acid chimera comprising a nucleic acid sequence encoding a polypeptide comprising a dengue-1/dengue-2 chimera comprising a nucleic acid sequence represented by SEQ ID NO.:1 (Pre-master), SEQ ID NO.3: (MVS), SEQ ID NO.5 (WVS): SEQ ID NO.:7 (BVS) or a combination thereof.
2. A polypeptide molecule encoded by a nucleic acid sequence encoding a dengue-1/dengue-2 chimera comprising the polypeptide molecule represented by SEQ ID NO: 2 (Pre-master), SEQ ID NO:4 (MVS), SEQ ID NO:6 (WVS), SEQ ID NO.:8 (BVS) or a combination thereof.
3. A pharmaceutical composition comprising at least one nucleic acid chimera according to claim 1, and a pharmaceutically acceptable excipient.
4. A pharmaceutical composition comprising at least one polypeptide molecule according to claim 2, and a pharmaceutically acceptable excipient.
5. Use of any of the compositions of claims 3 and 4 in the manufacture of a medicament for inducing an immune response in a subject, wherein the medicament induces an immune response to dengue virus in the subject.
6. A vector encoding a nucleic acid sequence of claim 1.
7. A nucleic acid sequence comprising a nucleic acid sequence encoding a modified live, attenuated dengue-2 virus comprising a nucleic acid sequence represented by SEQ ID NO.:9 (Pre-master), SEQ ID NO.11: (MVS), SEQ ID NO.13 (WVS): SEQ ID NO.:15 (BVS) or a combination thereof.
8. A polypeptide molecule encoded by a nucleic acid sequence encoding a live, attenuated dengue-2 virus comprising the polypeptide molecule represented by SEQ ID NO: 10 (Pre-master), SEQ ID NO:12 (MVS), SEQ ID NO:14 (WVS), SEQ ID NO.:16 (BVS) or a combination thereof.
9. A pharmaceutical composition comprising the nucleic acid chimera according to claim 7, and a pharmaceutically acceptable excipient.
10. A pharmaceutical composition comprising the polypeptide molecule according to claim 8, and a pharmaceutically acceptable excipient.

11. Use of any of the compositions of claims 9 and 10 in the manufacture of a medicament for inducing an immune response in a subject, wherein the medicament induces an immune response to dengue virus in the subject.
12. A vector encoding a nucleic acid sequence of any one of claim 7.
13. A nucleic acid chimera comprising a nucleic acid sequence encoding a polypeptide comprising a dengue-3/dengue-2 chimera comprising a nucleic acid sequence represented by SEQ ID NO.:17 (Pre-master), SEQ ID NO.19: (MVS), SEQ ID NO.21 (WVS): SEQ ID NO.:23 (BVS) or a combination thereof.
14. A polypeptide molecule encoded by a nucleic acid sequence encoding a dengue-3/dengue-2 chimera comprising the polypeptide molecule represented by SEQ ID NO: 18 (Pre-master), SEQ ID NO:20 (MVS), SEQ ID NO:22 (WVS), SEQ ID NO.:24 (BVS) or a combination thereof.
15. A pharmaceutical composition comprising the nucleic acid chimera according to claim 13, and a pharmaceutically acceptable excipient.
16. A pharmaceutical composition comprising the polypeptide molecule according to claim 16, and a pharmaceutically acceptable excipient.
17. Use of any of the compositions of claims 15 and 16 in the manufacture of a medicament for inducing an immune response in a subject, wherein the composition induces an immune response to dengue virus in the subject.
18. A vector encoding a nucleic acid sequence according to claim 13.
19. A nucleic acid chimera comprising a nucleic acid sequence encoding a polypeptide comprising a dengue-4/dengue-2 chimera comprising a nucleic acid sequence represented by SEQ ID NO.:25 (Pre-master), SEQ ID NO.27: (MVS), SEQ ID NO.29 (WVS): SEQ ID NO.:31 (BVS) or a combination thereof.
20. A polypeptide molecule encoded by a nucleic acid sequence encoding a dengue-4/dengue-2 chimera comprising the polypeptide molecule represented by SEQ ID NO: 226 (Pre-master), SEQ ID NO:28 (MVS), SEQ ID NO:6 (WVS), SEQ ID NO.:32 (BVS) or a combination thereof.
21. A pharmaceutical composition comprising a nucleic acid chimera of according to claim 19, and a pharmaceutically acceptable excipient.

22. A pharmaceutical composition comprising the polypeptide molecule according to claim 20, and a pharmaceutically acceptable excipient.

23. Use of any of the compositions of claims 21 and 22 in the manufacture of a medicament for inducing an immune response in a subject, wherein the composition induces an immune response to dengue virus in the subject.

24. A vector encoding a nucleic acid sequence according to claim 19.

25. An immunogenic composition comprising one or more, live, attenuated dengue viruses having a nucleotide sequence encoding a dengue virus or dengue virus chimera represented by SEQ ID NOS. 1, 3, 5, and 7, for a dengue-1/dengue-2 chimera; SEQ ID NOS. 9, 11, 13, and 15, for a live, attenuated dengue-2 virus; SEQ ID NOS. 17, 19, 21, and 23 for a dengue-3/dengue-2 chimera; and SEQ ID NOS. 25, 27, 29 and 31 for a dengue-4/dengue-2 chimera; and a pharmaceutically acceptable carrier.

26. The immunogenic composition of claim 25, wherein the live, attenuated dengue-2 virus is represented by the nucleic acid sequence of SEQ ID NO.15.

27. The immunogenic composition of claim 25, wherein the composition contains at least one, live attenuated virus that represents each of the four dengue virus serotypes, a tetravalent composition.

28. The immunogenic composition of any of claims 25, 26 or 27, further comprising an immunogenic composition comprising a flavivirus selected from the group consisting of yellow fever virus, tick-borne encephalitis virus, Japanese encephalitis virus, West Nile virus, hepatitis C virus, and a combination of two or more thereof.

29. A kit comprising at least one nucleic acid sequence according to any of claims 1, 7, 13 and 19; or at least one polypeptide sequence according to any of claims 2, 8, 14 and 20 or at least one composition according to any of claims 3, 4, 9, 10, 15, 16, 21, 22, or 25-28; and a container.

30. A live, attenuated dengue-1 chimeric virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:1 (Pre-master), SEQ ID NO.3: (MVS), SEQ ID NO.5 (WVS): SEQ ID NO.:7 (BVS) or a combination thereof, wherein one or more of the nucleic acid sequences are encapsidated.

31. A live, attenuated dengue-2 virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:9 (Pre-master), SEQ ID NO.11: (MVS), SEQ ID NO.13 (WVS): SEQ ID NO.:15 (BVS) or a combination thereof, wherein one or more of the nucleic acid sequences are encapsidated.

32. A live, attenuated dengue-3 chimeric virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:17 (Pre-master), SEQ ID NO.19: (MVS), SEQ ID NO.21 (WVS): SEQ ID NO.:23 (BVS) or a combination thereof wherein one or more of the nucleic acid sequences are encapsidated.

33. A live, attenuated dengue-4 chimeric virus comprising one or more polypeptide sequences encoded from one or more nucleic acid sequences comprising SEQ ID NO.:25 (Pre-master), SEQ ID NO.27: (MVS), SEQ ID NO.29 (WVS): SEQ ID NO.:31 (BVS) or a combination thereof wherein one or more of the nucleic acid sequences are encapsidated.

34. The composition according to any of claims 3, 4, 9, 10, 15, 16, 21, 22, and 25-28, further comprising a pharmaceutically acceptable adjuvant.

35. A nucleic acid dengue-1 chimera comprising nucleic acid sequences represented by SEQ ID NO:7 encoding a mixture of species containing nucleotides C and G at nucleotide position 2384 which encodes a mixture of dengue viral species containing amino acids Gly and Ala at amino acid 483.

36. A dengue-2 nucleic acid sequence comprising nucleic acid sequences represented by SEQ ID NO:15 encoding a mixture of species containing nucleotides G and C at nucleotide position 6481 which encodes a mixture of dengue viral species containing amino acids Ala and Pro in NS4A-36.

37. A dengue-2 nucleic acid sequence comprising nucleic acid sequences represented by SEQ ID NO:15 encoding a mixture of species containing nucleotides C and T at nucleotide position 7156 which encodes a mixture of dengue viral species containing Leu and Phe in NS4B-111.

38. A nucleic acid dengue 4 chimera comprising nucleic acid sequences represented by SEQ ID NO:31 encoding a mixture of species containing nucleotides C and T at

nucleotide position 7538 which encodes a mixture of dengue viral species containing Ser and Phe in NS4B-238.

39. A nucleic acid dengue 4 chimera comprising nucleic acid sequences represented by SEQ ID NO:31 encoding a mixture of species containing nucleotides A and G at nucleotide position 7337 which encodes a mixture of dengue viral species containing Lys and Arg in NS2A-99.

40. An isolated cell comprising the nucleic acid sequences according to any of claims 1, 7, 13, 19, and 35-39.

41. Use of a composition or a nucleic acid sequence or live, attenuated dengue virus according to any of claims 3, 4, 9, 10, 15, 16, 21, 22, 25-28, and 30-39 in the manufacture of a vaccine for inducing an immune response to dengue virus.

SEQUENCE LISTING

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THE GOVERNMENT OF THE UNITED STATES OF AMERICA AS REPRESENTED BY THE SECRETARY OF THE DEPARTMENT OF HEALTH AND HUMAN SERVICES
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<120> COMPOSITIONS AND METHODS FOR DENGUE VIRUS CHIMERIC CONSTRUCTS IN VACCINES

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Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
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    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Ala Glu Pro Asp
                165                 170                 175

Asp Val Asp Cys Trp Cys Asn Ala Thr Asp Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Ala Glu Thr Trp
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Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
                245                 250                 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
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Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
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Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
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Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
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Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
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Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
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His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
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Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
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Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
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Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
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Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
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Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
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Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
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Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
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1130                1135                1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
1145                1150                1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
1160                1165                1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
1175                1180                1185

Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
1190                1195                1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
1205                1210                1215

Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
1220                1225                1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Leu Pro Glu Thr Ile Leu
1235                1240                1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
1250                1255                1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
1265                1270                1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
1280                1285                1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
1295                1300                1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
1310                1315                1320

Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
1325                1330                1335

Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
1340                1345                1350

Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
1355                1360                1365
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Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
1370                1375                1380

Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
1385                1390                1395

Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
1400                1405                1410

Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
1415                1420                1425

Met Ser Ile Lys Asn Glu Glu Glu Asp Gln Thr Leu Thr Ile Leu
1430                1435                1440

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
1445                1450                1455

Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
1460                1465                1470

Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
1475                1480                1485

Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
1490                1495                1500

Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
1505                1510                1515

Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
1520                1525                1530

Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
1535                1540                1545

Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
1550                1555                1560

Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
1565                1570                1575

Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
1580                1585                1590

Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
1595                1600                1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
1610                1615                1620
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Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
1625 1630 1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
1640 1645 1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
1655 1660 1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
1670 1675 1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
1685 1690 1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
1700 1705 1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
1715 1720 1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
1730 1735 1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
1745 1750 1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
1760 1765 1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
1775 1780 1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
1790 1795 1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
1805 1810 1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
1820 1825 1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
1835 1840 1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
1850 1855 1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
1865 1870 1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
1880 1885 1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
1895 1900 1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
1910 1915 1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
1925 1930 1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
1940 1945 1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
1955 1960 1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
1970 1975 1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
1985 1990 1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
2000 2005 2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
2015 2020 2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
2030 2035 2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
2045 2050 2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
2060 2065 2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
2075 2080 2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
2090 2095 2100

Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asp Ala Leu
2105 2110 2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
2120 2125 2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
2135 2140 2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
2150 2155 2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
2165 2170 2175

Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
2180 2185 2190

Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
2195 2200 2205

Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
2210 2215 2220

Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
2225 2230 2235

Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
2240 2245 2250

Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
2255 2260 2265

Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
2270 2275 2280

Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
2285 2290 2295

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
2300 2305 2310

Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
2315 2320 2325

Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
2330 2335 2340

Gln Val Asn Pro Ile Thr Leu Ile Ala Ala Leu Phe Leu Leu Val
2345 2350 2355

Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
2360 2365 2370

Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
2375 2380 2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
2390 2395 2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
2405 2410 2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
2420 2425 2430

Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
2435 2440 2445

Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
2450 2455 2460

Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
2465 2470 2475

Leu Phe Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
2480 2485 2490

Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
2495 2500 2505

Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
2510 2515 2520

Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
2525 2530 2535

Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
2540 2545 2550

Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val
2555 2560 2565

Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570 2575 2580

Gly Leu Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly
2585 2590 2595

Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
2600 2605 2610

Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
2615 2620 2625

Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
2630 2635 2640

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Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
    2645                 2650                 2655

Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
    2660                 2665                 2670

Leu Asn  Pro Tyr Met Pro Ser  Val Ile Glu Lys Met  Glu Ala Leu
    2675                 2680                 2685

Gln Arg  Lys Tyr Gly Gly Ala  Leu Val Arg Asn Pro  Leu Ser Arg
    2690                 2695                 2700

Asn Ser  Thr His Glu Met Tyr  Trp Val Ser Asn Ala  Ser Gly Asn
    2705                 2710                 2715

Ile Val  Ser Ser Val Asn Met  Ile Ser Arg Met Leu  Ile Asn Arg
    2720                 2725                 2730

Phe Thr  Met Arg Tyr Lys Lys  Ala Thr Tyr Glu Pro  Asp Val Asp
    2735                 2740                 2745

Leu Gly  Ser Gly Thr Arg Asn  Ile Gly Ile Glu Ser  Glu Ile Pro
    2750                 2755                 2760

Asn Leu  Asp Ile Ile Gly Lys  Arg Ile Glu Lys Ile  Lys Gln Glu
    2765                 2770                 2775

His Glu  Thr Ser Trp His Tyr  Asp Gln Asp His Pro  Tyr Lys Thr
    2780                 2785                 2790

Trp Ala  Tyr His Gly Ser Tyr  Glu Thr Lys Gln Thr  Gly Ser Ala
    2795                 2800                 2805

Ser Ser  Met Val Asn Gly Val  Val Arg Leu Leu Thr  Lys Pro Trp
    2810                 2815                 2820

Asp Val  Val Pro Met Val Thr  Gln Met Ala Met Thr  Asp Thr Thr
    2825                 2830                 2835

Pro Phe  Gly Gln Gln Arg Val  Phe Lys Glu Lys Val  Asp Thr Arg
    2840                 2845                 2850

Thr Gln  Glu Pro Lys Glu Gly  Thr Lys Lys Leu Met  Lys Ile Thr
    2855                 2860                 2865

Ala Glu  Trp Leu Trp Lys Glu  Leu Gly Lys Lys Lys  Thr Pro Arg
    2870                 2875                 2880

Met Cys  Thr Arg Glu Glu Phe  Thr Arg Lys Val Arg  Ser Asn Ala
    2885                 2890                 2895
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Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
2900 2905 2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
2915 2920 2925

Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
2930 2935 2940

Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
2945 2950 2955

Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
2960 2965 2970

Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
2975 2980 2985

Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu
2990 2995 3000

His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
3005 3010 3015

Gly Ala Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile
3020 3025 3030

Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
3035 3040 3045

Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
3050 3055 3060

Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
3065 3070 3075

Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
3080 3085 3090

Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
3095 3100 3105

Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
3110 3115 3120

Gln His Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu
3125 3130 3135

Ala Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
3140 3145 3150

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Asp Asp  Cys Val Val Lys Pro  Leu Asp Asp Arg Phe  Ala Ser Ala
    3155                 3160                 3165

Leu Thr  Ala Leu Asn Asp Met  Gly Lys Ile Arg Lys  Asp Ile Gln
    3170                 3175                 3180

Gln Trp  Glu Pro Ser Arg Gly  Trp Asn Asp Trp Thr  Gln Val Pro
    3185                 3190                 3195

Phe Cys  Ser His His Phe His  Glu Leu Ile Met Lys  Asp Gly Arg
    3200                 3205                 3210

Val Leu  Val Val Pro Cys Arg  Asn Gln Asp Glu Leu  Ile Gly Arg
    3215                 3220                 3225

Ala Arg  Ile Ser Gln Gly Ala  Gly Trp Ser Leu Arg  Glu Thr Ala
    3230                 3235                 3240

Cys Leu  Gly Lys Ser Tyr Ala  Gln Met Trp Ser Leu  Met Tyr Phe
    3245                 3250                 3255

His Arg  Arg Asp Leu Arg Leu  Ala Ala Asn Ala Ile  Cys Ser Ala
    3260                 3265                 3270

Val Pro  Ser His Trp Val Pro  Thr Ser Arg Thr Thr  Trp Ser Ile
    3275                 3280                 3285

His Ala  Lys His Glu Trp Met  Thr Thr Glu Asp Met  Leu Thr Val
    3290                 3295                 3300

Trp Asn  Arg Val Trp Ile Gln  Glu Asn Pro Trp Met  Glu Asp Lys
    3305                 3310                 3315

Thr Pro  Val Glu Ser Trp Glu  Glu Ile Pro Tyr Leu  Gly Lys Arg
    3320                 3325                 3330

Glu Asp  Gln Trp Cys Gly Ser  Leu Ile Gly Leu Thr  Ser Arg Ala
    3335                 3340                 3345

Thr Trp  Ala Lys Asn Ile Gln  Ala Ala Ile Asn Gln  Val Arg Ser
    3350                 3355                 3360

Leu Ile  Gly Asn Glu Glu Tyr  Thr Asp Tyr Met Pro  Ser Met Lys
    3365                 3370                 3375

Arg Phe  Arg Arg Glu Glu Glu  Glu Ala Gly Val Leu  Trp Lys Ala
    3380                 3385                 3390

Lys Leu  Thr Asn Lys Ala Arg  Ser Gln Val Gly Leu  Ser His Ser
    3395                 3400                 3405
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Thr Glu Lys Thr Met Leu Pro Val Ser Pro Val Gln Gly Arg Lys
3410 3415 3420

Lys Ser Gly His His Lys Cys His Ser Leu Ser Lys Leu Cys Ser
3425 3430 3435

Leu Leu His Leu Arg Arg Cys Lys Lys Ser Gly Arg Pro Gln Thr
3440 3445 3450

Met Glu Ala Val Arg Met Ala Trp Thr Ser Gly
3455 3460

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<211> 3391
<212> PRT
<213> Artificial Sequence

<220>
<223> Dengue virus serotype 1, MVS

<400> 3

Met Asn Asn Gln Arg Lys Lys Ala Lys Asn Thr Pro Phe Asn Met Leu
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
20 25 30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
85 90 95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
100 105 110

Met Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
115 120 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
130 135 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145 150 155 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Ala Glu Pro Asp

165 170 175

Asp Val Asp Cys Trp Cys Asn Ala Thr Asp Thr Trp Val Thr Tyr Gly
180 185 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
195 200 205

Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Ala Glu Thr Trp
210 215 220

Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
225 230 235 240

Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
245 250 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
260 265 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
275 280 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
290 295 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305 310 315 320

Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
325 330 335

Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
340 345 350

Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Ala
355 360 365

Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
370 375 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
385 390 395 400

Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
405 410 415

Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
420 425 430

Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala

435 440 445

Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Thr Leu Thr Leu Asp
450 455 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Thr
465 470 475 480

Met Lys Glu Arg Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
485 490 495

Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
500 505 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
515 520 525

Glu Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
530 535 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
545 550 555 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
565 570 575

Met Ser Tyr Val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
580 585 590

Ala Glu Thr Gln His Gly Thr Val Leu Val Gln Val Lys Tyr Glu Gly
595 600 605

Thr Asp Ala Pro Cys Lys Ile Pro Phe Ser Thr Gln Asp Glu Lys Gly
610 615 620

Ala Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
625 630 635 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
645 650 655

Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
660 665 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
675 680 685

Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
690 695 700

Ile Gly Gly Val Phe Thr Ser Met Gly Lys Leu Val His Gln Val Phe

705 710 715 720

Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
725 730 735

Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Asn
740 745 750

Thr Ser Leu Ser Met Met Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
755 760 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
770 775 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785 790 795 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
805 810 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
820 825 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
835 840 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
850 855 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865 870 875 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
885 890 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
900 905 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
915 920 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
930 935 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945 950 955 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
965 970 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe

980 985 990

Ile Glu Val Lys Asn Cys His Trp Pro Lys Ser His Thr Leu Trp Ser
995 1000 1005

Asn Gly Val Leu Glu Ser Glu Met Ile Ile Pro Lys Asn Leu Ala
1010 1015 1020

Gly Pro Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln
1025 1030 1035

Ile Thr Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp
1040 1045 1050

Phe Cys Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
1070 1075 1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
1085 1090 1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
1115 1120 1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
1130 1135 1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
1145 1150 1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
1160 1165 1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
1175 1180 1185

Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
1190 1195 1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
1205 1210 1215

Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
1220 1225 1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Leu Pro Glu Thr Ile Leu

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1235                1240                1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
1250                1255                1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
1265                1270                1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
1280                1285                1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
1295                1300                1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
1310                1315                1320

Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
1325                1330                1335

Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
1340                1345                1350

Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
1355                1360                1365

Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
1370                1375                1380

Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
1385                1390                1395

Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
1400                1405                1410

Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
1415                1420                1425

Met Ser Ile Lys Asn Glu Glu Glu Asp Gln Thr Leu Thr Ile Leu
1430                1435                1440

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
1445                1450                1455

Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
1460                1465                1470

Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
1475                1480                1485

Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
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1490 1495 1500

Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
1505 1510 1515

Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
1520 1525 1530

Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
1535 1540 1545

Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
1550 1555 1560

Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
1565 1570 1575

Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
1580 1585 1590

Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
1595 1600 1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
1610 1615 1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
1625 1630 1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
1640 1645 1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
1655 1660 1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
1670 1675 1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
1685 1690 1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
1700 1705 1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
1715 1720 1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
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Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met

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atgttgatca acagatttac aatgagatac aagaaagcca cttacgagcc ggatgttgac 8340

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gaaaggaatc tccatcttga aggaaagtgt gaaacatgtg tgtacaacat gatgggaaaa 8940

agagaggaga agctagggga attcggcaag gcaaaaggca gcagagccat atggtacatg 9000

tggcttggag cacgcttctt agagtttgaa gccctaggat tcttaaatga agatcactgg 9060

ttctccagag agaactccct gagtggagtg gaaggagaag ggctgcacaa gctaggttac 9120

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gtgcgtgtgc aaagaccaac accaagaggc acagtaatgg acatcatatc gagaagagac 9360

caaagaggta gtggacaagt tggcacctat ggactcaata ctttcaccaa tatggaagcc 9420

caactaatca gacagatgga gggagaagga gtctttaaaa gcattcagca cctaacaatc 9480

acagaagaaa tcgctgtgca aaactggtta gcaagagtgg ggcgcgaaag gttatcaaga 9540

atggccatca gtggagatga ttgtgttgtg aaacctttag atgacaggtt cgcaagcgct 9600

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1               5                  10                  15

Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Arg Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Val Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Ile Thr Tyr Glu Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Thr Thr Met Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205

Leu Val Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Val Gln Arg Ile Glu Thr Trp
225                 230                 235                 240

Ile Leu Arg His Pro Gly Phe Thr Met Met Ala Ala Ile Leu Ala Tyr
                245                 250                 255

Thr Ile Gly Thr Thr His Phe Gln Arg Ala Leu Ile Phe Ile Leu Leu
            260                 265                 270
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Thr Ala Val Thr Pro Ser Met Thr Met Arg Cys Ile Gly Met Ser Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Ile Lys Thr Glu Ala Lys Gln Pro Ala Thr Leu
                325                 330                 335

Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Glu Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
        355                 360                 365

Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Arg
385                 390                 395                 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu His Ala Val Gly
            420                 425                 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Ile Thr Pro Gln Ser
        435                 440                 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465                 470                 475                 480

Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
            500                 505                 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
        515                 520                 525

Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540
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Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
                565                 570                 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
        595                 600                 605

Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
    610                 615                 620

Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
625                 630                 635                 640

Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Asn Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
705                 710                 715                 720

Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Leu Ile Gly Val Ile Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
            740                 745                 750

Thr Ser Leu Ser Val Thr Leu Val Leu Val Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815
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Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
820 825 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
835 840 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
850 855 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865 870 875 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
885 890 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
900 905 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
915 920 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
930 935 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945 950 955 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
965 970 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
980 985 990

Ile Glu Val Lys Asn Cys His Trp Pro Lys Ser His Thr Leu Trp Ser
995 1000 1005

Asn Gly Val Leu Glu Ser Glu Met Ile Ile Pro Lys Asn Leu Ala
1010 1015 1020

Gly Pro Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln
1025 1030 1035

Ile Thr Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp
1040 1045 1050

Phe Cys Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
1070 1075 1080

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Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
    1085                1090                1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
    1100                1105                1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
    1115                1120                1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
    1130                1135                1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
    1145                1150                1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
    1160                1165                1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
    1175                1180                1185

Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
    1190                1195                1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
    1205                1210                1215

Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
    1220                1225                1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
    1235                1240                1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
    1250                1255                1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
    1265                1270                1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
    1280                1285                1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
    1295                1300                1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
    1310                1315                1320

Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
    1325                1330                1335
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Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                 1345                 1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                 1360                 1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                 1375                 1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                 1390                 1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                 1405                 1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Glu Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                 1555                 1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                 1570                 1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                 1585                 1590
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Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
    1595                1600                1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
    1610                1615                1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
    1625                1630                1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
    1640                1645                1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
    1655                1660                1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
    1670                1675                1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
    1685                1690                1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
    1700                1705                1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
    1715                1720                1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
    1730                1735                1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
    1745                1750                1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
    1760                1765                1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
    1775                1780                1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
    1790                1795                1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
    1805                1810                1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
    1820                1825                1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
    1835                1840                1845
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Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
    1850                1855                1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
    1865                1870                1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
    1880                1885                1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
    1895                1900                1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
    1910                1915                1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
    1925                1930                1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
    1940                1945                1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
    1955                1960                1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
    1970                1975                1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
    1985                1990                1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
    2000                2005                2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
    2015                2020                2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
    2030                2035                2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
    2045                2050                2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
    2060                2065                2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
    2075                2080                2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
    2090                2095                2100
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Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asp Ala Leu
2105 2110 2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Pro Gly Gly Arg Ala
2120 2125 2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
2135 2140 2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
2150 2155 2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
2165 2170 2175

Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
2180 2185 2190

Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
2195 2200 2205

Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
2210 2215 2220

Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
2225 2230 2235

Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
2240 2245 2250

Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
2255 2260 2265

Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
2270 2275 2280

Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
2285 2290 2295

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
2300 2305 2310

Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
2315 2320 2325

Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
2330 2335 2340

Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Phe Phe Leu Leu Val
2345 2350 2355

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Ala His  Tyr Ala Ile Ile Gly  Pro Gly Leu Gln Ala  Lys Ala Thr
    2360                 2365                 2370

Arg Glu  Ala Gln Lys Arg Ala  Ala Ala Gly Ile Met  Lys Asn Pro
    2375                 2380                 2385

Thr Val  Asp Gly Ile Thr Val  Ile Asp Leu Asp Pro  Ile Pro Tyr
    2390                 2395                 2400

Asp Pro  Lys Phe Glu Lys Gln  Leu Gly Gln Val Met  Leu Leu Val
    2405                 2410                 2415

Leu Cys  Val Thr Gln Val Leu  Met Met Arg Thr Thr  Trp Ala Leu
    2420                 2425                 2430

Cys Glu  Ala Leu Thr Leu Ala  Thr Gly Pro Ile Ser  Thr Leu Trp
    2435                 2440                 2445

Glu Gly  Asn Pro Gly Arg Phe  Trp Asn Thr Thr Ile  Ala Val Ser
    2450                 2455                 2460

Met Ala  Asn Ile Phe Arg Gly  Ser Tyr Leu Ala Gly  Ala Gly Leu
    2465                 2470                 2475

Leu Phe  Ser Ile Met Lys Asn  Thr Thr Asn Thr Arg  Arg Gly Thr
    2480                 2485                 2490

Gly Asn  Ile Gly Glu Thr Leu  Gly Glu Lys Trp Lys  Ser Arg Leu
    2495                 2500                 2505

Asn Ala  Leu Gly Lys Ser Glu  Phe Gln Ile Tyr Lys  Lys Ser Gly
    2510                 2515                 2520

Ile Gln  Glu Val Asp Arg Thr  Leu Ala Lys Glu Gly  Ile Lys Arg
    2525                 2530                 2535

Gly Glu  Thr Asp His His Ala  Val Ser Arg Gly Ser  Ala Lys Leu
    2540                 2545                 2550

Arg Trp  Phe Val Glu Arg Asn  Met Val Thr Pro Glu  Gly Lys Val
    2555                 2560                 2565

Val Asp  Leu Gly Cys Gly Arg  Gly Gly Trp Ser Tyr  Tyr Cys Gly
    2570                 2575                 2580

Gly Leu  Lys Asn Val Arg Glu  Val Lys Gly Leu Thr  Lys Gly Gly
    2585                 2590                 2595

Pro Gly  His Glu Glu Pro Ile  Pro Met Ser Thr Tyr  Gly Trp Asn
    2600                 2605                 2610
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Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
2615 2620 2625

Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
2630 2635 2640

Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
2645 2650 2655

Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
2660 2665 2670

Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
2675 2680 2685

Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
2690 2695 2700

Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
2705 2710 2715

Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
2720 2725 2730

Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
2735 2740 2745

Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
2750 2755 2760

Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
2765 2770 2775

His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
2780 2785 2790

Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
2795 2800 2805

Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp
2810 2815 2820

Asp Val Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
2825 2830 2835

Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
2840 2845 2850

Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
2855 2860 2865

Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
2870 2875 2880

Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
2885 2890 2895

Ala Leu Gly Ala Val Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
2900 2905 2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
2915 2920 2925

Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
2930 2935 2940

Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
2945 2950 2955

Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
2960 2965 2970

Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
2975 2980 2985

Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu
2990 2995 3000

His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
3005 3010 3015

Gly Ala Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile
3020 3025 3030

Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
3035 3040 3045

Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
3050 3055 3060

Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
3065 3070 3075

Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
3080 3085 3090

Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
3095 3100 3105

Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
3110 3115 3120

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Gln His  Leu Thr Ile Thr Glu  Glu Ile Ala Val Gln  Asn Trp Leu
     3125                3130                3135

Ala Arg  Val Gly Arg Glu Arg  Leu Ser Arg Met Ala  Ile Ser Gly
     3140                3145                3150

Asp Asp  Cys Val Val Lys Pro  Leu Asp Asp Arg Phe  Ala Ser Ala
     3155                3160                3165

Leu Thr  Ala Leu Asn Asp Met  Gly Lys Ile Arg Lys  Asp Ile Gln
     3170                3175                3180

Gln Trp  Glu Pro Ser Arg Gly  Trp Asn Asp Trp Thr  Gln Val Pro
     3185                3190                3195

Phe Cys  Ser His His Phe His  Glu Leu Ile Met Lys  Asp Gly Arg
     3200                3205                3210

Val Leu  Val Val Pro Cys Arg  Asn Gln Asp Glu Leu  Ile Gly Arg
     3215                3220                3225

Ala Arg  Ile Ser Gln Gly Ala  Gly Trp Ser Leu Arg  Glu Thr Ala
     3230                3235                3240

Cys Leu  Gly Lys Ser Tyr Ala  Gln Met Trp Ser Leu  Met Tyr Phe
     3245                3250                3255

His Arg  Arg Asp Leu Arg Leu  Ala Ala Asn Ala Ile  Cys Ser Ala
     3260                3265                3270

Val Pro  Ser His Trp Val Pro  Thr Ser Arg Thr Thr  Trp Ser Ile
     3275                3280                3285

His Ala  Lys His Glu Trp Met  Thr Thr Glu Asp Met  Leu Thr Val
     3290                3295                3300

Trp Asn  Arg Val Trp Ile Gln  Glu Asn Pro Trp Met  Glu Asp Lys
     3305                3310                3315

Thr Pro  Val Glu Ser Trp Glu  Glu Ile Pro Tyr Leu  Gly Lys Arg
     3320                3325                3330

Glu Asp  Gln Trp Cys Gly Ser  Leu Ile Gly Leu Thr  Ser Arg Ala
     3335                3340                3345

Thr Trp  Ala Lys Asn Ile Gln  Ala Ala Ile Asn Gln  Val Arg Ser
     3350                3355                3360

Leu Ile  Gly Asn Glu Glu Tyr  Thr Asp Tyr Met Pro  Ser Met Lys
     3365                3370                3375
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3380 3385 3390

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Met Asn Asn Gln Arg Lys Lys Ala Lys Asn Thr Pro Phe Asn Met Leu
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
20 25 30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
85 90 95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
100 105 110

Met Ala Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val
115 120 125

Ser Arg Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Val Gly
130 135 140

Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
145 150 155 160

Asp Thr Ile Thr Tyr Glu Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
165 170 175

Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
180 185 190

Thr Cys Thr Thr Met Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
195 200 205

Leu Val Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp

210 215 220

Met Ser Ser Glu Gly Ala Trp Lys His Val Gln Arg Ile Glu Thr Trp
225 230 235 240

Ile Leu Arg His Pro Gly Phe Thr Met Met Ala Ala Ile Leu Ala Tyr
245 250 255

Thr Ile Gly Thr Thr His Phe Gln Arg Ala Leu Ile Phe Ile Leu Leu
260 265 270

Thr Ala Val Thr Pro Ser Met Thr Met Arg Cys Ile Gly Met Ser Asn
275 280 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val
290 295 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305 310 315 320

Leu Asp Phe Glu Leu Ile Lys Thr Glu Ala Lys Gln Pro Ala Thr Leu
325 330 335

Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Glu Ser
340 345 350

Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
355 360 365

Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
370 375 380

Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Arg
385 390 395 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
405 410 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu His Ala Val Gly
420 425 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Ile Thr Pro Gln Ser
435 440 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
450 455 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465 470 475 480

Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu

485 490 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
500 505 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
515 520 525

Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
530 535 540

Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545 550 555 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
565 570 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
580 585 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
595 600 605

Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
610 615 620

Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
625 630 635 640

Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
645 650 655

Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Asn Trp Phe
660 665 670

Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
675 680 685

Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
690 695 700

Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
705 710 715 720

Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
725 730 735

Ile Leu Ile Gly Val Ile Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
740 745 750

Thr Ser Leu Ser Val Thr Leu Val Leu Val Gly Ile Val Thr Leu Tyr

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        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
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Ile Thr Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp
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Phe Cys Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
1070 1075 1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
1085 1090 1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
1115 1120 1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
1130 1135 1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
1145 1150 1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
1160 1165 1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
1175 1180 1185

Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
1190 1195 1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
1205 1210 1215

Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
1220 1225 1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
1235 1240 1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
1250 1255 1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
1265 1270 1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys

1280 1285 1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
1295 1300 1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
1310 1315 1320

Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
1325 1330 1335

Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
1340 1345 1350

Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
1355 1360 1365

Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
1370 1375 1380

Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
1385 1390 1395

Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
1400 1405 1410

Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
1415 1420 1425

Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
1430 1435 1440

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
1445 1450 1455

Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
1460 1465 1470

Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
1475 1480 1485

Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
1490 1495 1500

Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
1505 1510 1515

Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
1520 1525 1530

Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys

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1535                1540                1545

Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
1550                1555                1560

Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
1565                1570                1575

Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
1580                1585                1590

Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
1595                1600                1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
1610                1615                1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
1625                1630                1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
1640                1645                1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
1655                1660                1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
1670                1675                1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
1685                1690                1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
1700                1705                1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
1715                1720                1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
1730                1735                1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
1745                1750                1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
1760                1765                1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
1775                1780                1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
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1790 1795 1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
1805 1810 1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
1820 1825 1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
1835 1840 1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
1850 1855 1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
1865 1870 1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
1880 1885 1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
1895 1900 1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
1910 1915 1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
1925 1930 1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
1940 1945 1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
1955 1960 1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
1970 1975 1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
1985 1990 1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
2000 2005 2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
2015 2020 2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
2030 2035 2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr

2045 2050 2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
2060 2065 2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
2075 2080 2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
2090 2095 2100

Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asp Ala Leu
2105 2110 2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
2120 2125 2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
2135 2140 2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
2150 2155 2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
2165 2170 2175

Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
2180 2185 2190

Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
2195 2200 2205

Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
2210 2215 2220

Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
2225 2230 2235

Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
2240 2245 2250

Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
2255 2260 2265

Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
2270 2275 2280

Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
2285 2290 2295

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn

2300 2305 2310

Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
2315 2320 2325

Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
2330 2335 2340

Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Leu Phe Leu Leu Val
2345 2350 2355

Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
2360 2365 2370

Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
2375 2380 2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
2390 2395 2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
2405 2410 2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
2420 2425 2430

Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
2435 2440 2445

Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
2450 2455 2460

Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
2465 2470 2475

Leu Phe Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
2480 2485 2490

Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
2495 2500 2505

Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
2510 2515 2520

Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
2525 2530 2535

Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
2540 2545 2550

Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val

2555 2560 2565

Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570 2575 2580

Gly Leu Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly
2585 2590 2595

Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
2600 2605 2610

Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
2615 2620 2625

Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
2630 2635 2640

Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
2645 2650 2655

Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
2660 2665 2670

Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
2675 2680 2685

Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
2690 2695 2700

Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
2705 2710 2715

Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
2720 2725 2730

Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
2735 2740 2745

Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
2750 2755 2760

Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
2765 2770 2775

His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
2780 2785 2790

Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
2795 2800 2805

Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp

2810 2815 2820

Asp Val Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
2825 2830 2835

Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
2840 2845 2850

Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
2855 2860 2865

Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
2870 2875 2880

Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
2885 2890 2895

Ala Leu Gly Ala Val Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
2900 2905 2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
2915 2920 2925

Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
2930 2935 2940

Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
2945 2950 2955

Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
2960 2965 2970

Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
2975 2980 2985

Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu
2990 2995 3000

His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
3005 3010 3015

Gly Ala Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile
3020 3025 3030

Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
3035 3040 3045

Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
3050 3055 3060

Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly

3065 3070 3075

Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
3080 3085 3090

Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
3095 3100 3105

Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
3110 3115 3120

Gln His Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu
3125 3130 3135

Ala Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
3140 3145 3150

Asp Asp Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala
3155 3160 3165

Leu Thr Ala Leu Asn Asp Met Gly Lys Ile Arg Lys Asp Ile Gln
3170 3175 3180

Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
3185 3190 3195

Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
3200 3205 3210

Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
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Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
3230 3235 3240

Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
3245 3250 3255

His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
3260 3265 3270

Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
3275 3280 3285

His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
3290 3295 3300

Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
3305 3310 3315

Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg

3320 3325 3330

Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala
3335 3340 3345

Thr Trp Ala Lys Asn Ile Gln Ala Ala Ile Asn Gln Val Arg Ser
3350 3355 3360

Leu Ile Gly Asn Glu Glu Tyr Thr Asp Tyr Met Pro Ser Met Lys
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ctgacaaaga gattctcact tggaatgctg cagggacgag gaccattaaa actgttcatg 240

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attccaacag tgatggcgtt ccatttaacc acgcgtgatg gagagccgcg catgattgtg 480

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gtgacttatg gaacatgcaa tcaagctgga gagcatagac gcgataagag atcagtggcg 720

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acaaccgact caagatgtcc cacccaaggg gaagcgattt tacctgagga gcaggaccag 1200

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caatggttct ttgacttacc cctaccatgg acatcaggag cttcagcaga aacaccaact 1620

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Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
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Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
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Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Arg Met Ile Val
        115                 120                 125

Gly Lys Asn Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ala Ser Gly
    130                 135                 140

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro His Ile Thr Glu Val Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Thr Gln Thr Trp
    210                 215                 220

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
                245                 250                 255

Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
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Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
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Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Ile Thr Thr Asp Ser
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Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
        355                 360                 365

Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
385                 390                 395                 400

Cys Leu Glu Ser Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
                405                 410                 415

Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
        435                 440                 445

Ala Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
    450                 455                 460

Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Ser Leu Thr Met Lys
465                 470                 475                 480

Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
                485                 490                 495

Pro Trp Thr Ser Gly Ala Ser Ala Glu Thr Pro Thr Trp Asn Arg Lys
            500                 505                 510

Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
        515                 520                 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
    530                 535                 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
545                 550                 555                 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
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Tyr Ala Met Cys Leu Ser Ser Phe Val Leu Lys Lys Glu Val Ser Glu
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Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
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Leu Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
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Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
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Val Ile Gly Ile Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
            660                 665                 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
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Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
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Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
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Ala Tyr Thr Ala Leu Phe Gly Gly Val Ser Trp Met Met Lys Ile Gly
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Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
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Met Ser Phe Ser Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr Leu Gly
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Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys Asn Lys
    770                 775                 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val His Thr
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Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys Leu Ala
                805                 810                 815

Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile Arg Ser
            820                 825                 830

Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro Glu Leu
        835                 840                 845

Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met Thr Gly
    850                 855                 860
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Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg Pro Gln
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Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Met
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Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly Pro Glu
            900                 905                 910

Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu Glu Val
        915                 920                 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
    930                 935                 940

Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser Ala Ala
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Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
                965                 970                 975

Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe Ile Glu
            980                 985                 990

Val Lys Asn Cys His Trp Pro Lys  Ser His Thr Leu Trp  Ser Asn Gly
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Val Leu  Glu Ser Glu Met Ile  Ile Pro Lys Asn Leu  Ala Gly Pro
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Val Ser  Gln His Asn Tyr Arg  Pro Gly Tyr His Thr  Gln Ile Thr
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Gly Pro  Trp His Leu Gly Lys  Leu Glu Met Asp Phe  Asp Phe Cys
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Asp Gly  Thr Thr Val Val Val  Thr Glu Asp Cys Gly  Asn Arg Gly
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Pro Ser  Leu Arg Thr Thr Thr  Ala Ser Gly Lys Leu  Ile Thr Glu
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Trp Cys  Cys Arg Ser Cys Thr  Leu Pro Pro Leu Arg  Tyr Arg Gly
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Glu Asp  Gly Cys Trp Tyr Gly  Met Glu Ile Arg Pro  Leu Lys Glu
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Lys Glu  Glu Asn Leu Val Asn  Ser Leu Val Thr Ala  Gly His Gly
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Leu Leu  Val Ala Val Ser Phe  Val Thr Leu Ile Thr  Gly Asn Met
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Ser Phe  Arg Asp Leu Gly Arg  Val Met Val Met Val  Gly Ala Thr
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Met Thr  Asp Asp Ile Gly Met  Gly Val Thr Tyr Leu  Ala Leu Leu
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Ala Ala  Phe Lys Val Arg Pro  Thr Phe Ala Ala Gly  Leu Leu Leu
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Arg Lys  Leu Thr Ser Lys Glu  Leu Met Met Thr Thr  Ile Gly Ile
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Val Leu  Leu Ser Gln Ser Thr  Ile Pro Glu Thr Ile  Leu Glu Leu
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Thr Asp  Ala Leu Ala Leu Gly  Met Met Val Leu Lys  Met Val Arg
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Cys Val  Pro Asn Ala Val Ile  Leu Gln Asn Ala Trp  Lys Val Ser
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Cys Thr  Ile Leu Ala Val Val  Ser Val Ser Pro Leu  Phe Leu Thr
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Ser Ser  Gln Gln Lys Thr Asp  Trp Ile Pro Leu Ala  Leu Thr Ile
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Lys Gly  Leu Asn Pro Thr Ala  Ile Phe Leu Thr Thr  Leu Ser Arg
    1325                1330                1335

Thr Ser  Lys Lys Arg Ser Trp  Pro Leu Asn Glu Ala  Ile Met Ala
    1340                1345                1350

Val Gly  Met Val Ser Ile Leu  Ala Ser Ser Leu Leu  Lys Asn Asp
    1355                1360                1365

Ile Pro  Met Thr Gly Pro Leu  Val Ala Gly Gly Leu  Leu Thr Val
    1370                1375                1380
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Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu Glu Arg
1385                1390                1395

Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser Gly Ser
1400                1405                1410

Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser Met Ser
1415                1420                1425

Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu Ile Arg
1430                1435                1440

Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser Ile Pro
1445                1450                1455

Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys Gln Arg
1460                1465                1470

Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met Gly Lys
1475                1480                1485

Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys Gly Ile
1490                1495                1500

Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu Gly Thr
1505                1510                1515

Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu Met His
1520                1525                1530

Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys Lys Asp
1535                1540                1545

Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu Trp Lys
1550                1555                1560

Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly Lys Asn
1565                1570                1575

Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Asn Ala
1580                1585                1590

Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly Thr Ser
1595                1600                1605

Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly Leu Tyr
1610                1615                1620

Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser Ala Ile
1625                1630                1635
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Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile Glu Asp
1640                1645                1650

Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu His Pro
1655                1660                1665

Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val Arg Glu
1670                1675                1680

Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro Thr Arg
1685                1690                1695

Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro Ile
1700                1705                1710

Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly Arg Glu
1715                1720                1725

Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg Leu Leu
1730                1735                1740

Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met Asp Glu
1745                1750                1755

Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly Tyr Ile
1760                1765                1770

Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe Met Thr
1775                1780                1785

Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser Asn Ala
1790                1795                1800

Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser Trp Asn
1805                1810                1815

Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr Val Trp
1820                1825                1830

Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala Cys Leu
1835                1840                1845

Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys Thr Phe
1850                1855                1860

Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp Phe Val
1865                1870                1875

Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys Ala Glu
1880                1885                1890
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Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile Leu Thr
1895                1900                1905

Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro Val Thr
1910                1915                1920

His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro
1925                1930                1935

Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro Leu Glu
1940                1945                1950

Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met Leu Leu
1955                1960                1965

Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met Phe Glu
1970                1975                1980

Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr Arg Leu
1985                1990                1995

Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg Arg Gly
2000                2005                2010

Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu Gly Ile
2015                2020                2025

Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys Asn Asn
2030                2035                2040

Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr Lys Glu
2045                2050                2055

Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala Arg Ile
2060                2065                2070

Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe Ala Ala
2075                2080                2085

Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met Gly Arg
2090                2095                2100

Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asn Ala Leu Asp Asn
2105                2110                2115

Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala Tyr Asn
2120                2125                2130

His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu Leu Leu
2135                2140                2145
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Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu Phe Leu
2150 2155 2160

Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met Cys Cys
2165 2170 2175

Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile Gln Pro
2180 2185 2190

His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu Ile Val
2195 2200 2205

Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln Asp Asn
2210 2215 2220

Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val Ala Ala
2225 2230 2235

Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys Lys Asp
2240 2245 2250

Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser Asn Ile
2255 2260 2265

Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu Tyr Ala
2270 2275 2280

Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser Ile Glu
2285 2290 2295

Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn Gln Ala
2300 2305 2310

Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser Lys Met
2315 2320 2325

Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser Gln Val
2330 2335 2340

Asn Pro Ile Thr Leu Thr Ala Ala Leu Phe Leu Leu Val Ala His
2345 2350 2355

Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr Arg Glu
2360 2365 2370

Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro Thr Val
2375 2380 2385

Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr Asp Pro
2390 2395 2400

Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val Leu Cys
2405 2410 2415

Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu Cys Glu
2420 2425 2430

Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp Glu Gly
2435 2440 2445

Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser Met Ala
2450 2455 2460

Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Leu Phe
2465 2470 2475

Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr Gly Asn
2480 2485 2490

Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu Asn Ala
2495 2500 2505

Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly Ile Gln
2510 2515 2520

Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg Gly Glu
2525 2530 2535

Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu Arg Trp
2540 2545 2550

Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val Val Asp
2555 2560 2565

Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly Gly Leu
2570 2575 2580

Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly Pro Gly
2585 2590 2595

His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn Leu Val
2600 2605 2610

Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro Glu Lys
2615 2620 2625

Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro Asn Pro
2630 2635 2640

Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu Val Glu
2645 2650 2655

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Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val Leu Asn
2660                2665                2670

Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu Gln Arg
2675                2680                2685

Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg Asn Ser
2690                2695                2700

Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn Ile Val
2705                2710                2715

Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg Phe Thr
2720                2725                2730

Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp Leu Gly
2735                2740                2745

Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro Asn Leu
2750                2755                2760

Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu His Glu
2765                2770                2775

Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr Trp Ala
2780                2785                2790

Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala Ser Ser
2795                2800                2805

Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp Asp Val
2810                2815                2820

Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr Pro Phe
2825                2830                2835

Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Gln
2840                2845                2850

Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr Ala Glu
2855                2860                2865

Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg Met Cys
2870                2875                2880

Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala Ala Leu
2885                2890                2895

Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala Arg Glu
2900                2905                2910
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Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys Glu Arg
2915 2920 2925

Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr Asn Met
2930 2935 2940

Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys Ala Lys
2945 2950 2955

Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Phe Leu
2960 2965 2970

Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser
2975 2980 2985

Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu His Lys
2990 2995 3000

Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly Gly Ala
3005 3010 3015

Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Leu
3020 3025 3030

Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met Glu Gly
3035 3040 3045

Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr Tyr Gln
3050 3055 3060

Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly Thr Val
3065 3070 3075

Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly Gln Val
3080 3085 3090

Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala Gln Leu
3095 3100 3105

Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile Gln His
3110 3115 3120

Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu Ala Arg
3125 3130 3135

Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly Asp Asp
3140 3145 3150

Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala Leu Thr
3155 3160 3165

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Ala Leu  Asn Asp Met Gly Lys  Ile Arg Lys Asp Ile  Gln Gln Trp
    3170                 3175                 3180

Glu Pro  Ser Arg Gly Trp Asn  Asp Trp Thr Gln Val  Pro Phe Cys
    3185                 3190                 3195

Ser His  His Phe His Glu Leu  Ile Met Lys Asp Gly  Arg Val Leu
    3200                 3205                 3210

Val Val  Pro Cys Arg Asn Gln  Asp Glu Leu Ile Gly  Arg Ala Arg
    3215                 3220                 3225

Ile Ser  Gln Gly Ala Gly Trp  Ser Leu Arg Glu Thr  Ala Cys Leu
    3230                 3235                 3240

Gly Lys  Ser Tyr Ala Gln Met  Trp Ser Leu Met Tyr  Phe His Arg
    3245                 3250                 3255

Arg Asp  Leu Arg Leu Ala Ala  Asn Ala Ile Cys Ser  Ala Val Pro
    3260                 3265                 3270

Ser His  Trp Val Pro Thr Ser  Arg Thr Thr Trp Ser  Ile His Ala
    3275                 3280                 3285

Lys His  Glu Trp Met Thr Thr  Glu Asp Met Leu Thr  Val Trp Asn
    3290                 3295                 3300

Arg Val  Trp Ile Gln Glu Asn  Pro Trp Met Glu Asp  Lys Thr Pro
    3305                 3310                 3315

Val Glu  Ser Trp Glu Glu Ile  Pro Tyr Leu Gly Lys  Arg Glu Asp
    3320                 3325                 3330

Gln Trp  Cys Gly Ser Leu Ile  Gly Leu Thr Ser Arg  Ala Thr Trp
    3335                 3340                 3345

Ala Lys  Asn Ile Gln Ala Ala  Ile Asn Gln Val Arg  Ser Leu Ile
    3350                 3355                 3360

Gly Asn  Glu Glu Tyr Thr Asp  Tyr Met Pro Ser Met  Lys Arg Phe
    3365                 3370                 3375

Arg Arg  Glu Glu Glu Glu Ala  Gly Val Leu Trp
    3380                 3385
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<211> 3389
<212> PRT
<213> Artificial Sequence

<220>
<223> Dengue virus serotype 3, MVS

<400> 9

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Met Asn Asn Gln Arg Lys Lys Ala Lys Asn Thr Pro Phe Asn Met Leu
1               5                  10                  15

Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Arg Met Ile Val
        115                 120                 125

Gly Lys Asn Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ala Ser Gly
    130                 135                 140

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro His Ile Thr Glu Val Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Thr Gln Thr Trp
    210                 215                 220

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
                245                 250                 255

Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
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260 265 270

Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
275 280 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
290 295 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305 310 315 320

Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
325 330 335

Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Ile Thr Thr Asp Ser
340 345 350

Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
355 360 365

Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
370 375 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
385 390 395 400

Cys Leu Glu Ser Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
405 410 415

Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
420 425 430

Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
435 440 445

Ala Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
450 455 460

Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Ser Leu Thr Met Lys
465 470 475 480

Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
485 490 495

Pro Trp Thr Ser Gly Ala Ser Ala Glu Thr Pro Thr Trp Asn Arg Lys
500 505 510

Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
515 520 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly

530 535 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
545 550 555 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
565 570 575

Tyr Ala Met Cys Leu Ser Ser Phe Val Leu Lys Lys Glu Val Ser Glu
580 585 590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
595 600 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
610 615 620

Leu Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
625 630 635 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
645 650 655

Val Ile Gly Ile Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
660 665 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
675 680 685

Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
690 695 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
705 710 715 720

Ala Tyr Thr Ala Leu Phe Gly Gly Val Ser Trp Met Met Lys Ile Gly
725 730 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
740 745 750

Met Ser Phe Ser Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr Leu Gly
755 760 765

Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys Asn Lys
770 775 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val His Thr
785 790 795 800

Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys Leu Ala

805 810 815

Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile Arg Ser
820 825 830

Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro Glu Leu
835 840 845

Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met Thr Gly
850 855 860

Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg Pro Gln
865 870 875 880

Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Met
885 890 895

Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly Pro Glu
900 905 910

Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu Glu Val
915 920 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
930 935 940

Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser Ala Ala
945 950 955 960

Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
965 970 975

Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe Ile Glu
980 985 990

Val Lys Asn Cys His Trp Pro Lys Ser His Thr Leu Trp Ser Asn Gly
995 1000 1005

Val Leu Glu Ser Glu Met Ile Ile Pro Lys Asn Leu Ala Gly Pro
1010 1015 1020

Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln Ile Thr
1025 1030 1035

Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp Phe Cys
1040 1045 1050

Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn Arg Gly
1055 1060 1065

Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile Thr Glu

1070 1075 1080

Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr Arg Gly
1085 1090 1095

Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu Lys Glu
1100 1105 1110

Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly His Gly
1115 1120 1125

Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala Leu Phe
1130 1135 1140

Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His Ala Ile
1145 1150 1155

Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly Asn Met
1160 1165 1170

Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly Ala Thr
1175 1180 1185

Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala Leu Leu
1190 1195 1200

Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu Leu Leu
1205 1210 1215

Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile Gly Ile
1220 1225 1230

Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu Glu Leu
1235 1240 1245

Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met Val Arg
1250 1255 1260

Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala Ile Leu
1265 1270 1275

Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys Val Ser
1280 1285 1290

Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe Leu Thr
1295 1300 1305

Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu Thr Ile
1310 1315 1320

Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu Ser Arg

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1325                1330                1335

Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile Met Ala
1340                1345                1350

Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys Asn Asp
1355                1360                1365

Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu Thr Val
1370                1375                1380

Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu Glu Arg
1385                1390                1395

Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser Gly Ser
1400                1405                1410

Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser Met Ser
1415                1420                1425

Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu Ile Arg
1430                1435                1440

Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser Ile Pro
1445                1450                1455

Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys Gln Arg
1460                1465                1470

Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met Gly Lys
1475                1480                1485

Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys Gly Ile
1490                1495                1500

Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu Gly Thr
1505                1510                1515

Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu Met His
1520                1525                1530

Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys Lys Asp
1535                1540                1545

Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu Trp Lys
1550                1555                1560

Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly Lys Asn
1565                1570                1575

Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Asn Ala
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1580 1585 1590

Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly Thr Ser
1595 1600 1605

Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly Leu Tyr
1610 1615 1620

Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser Ala Ile
1625 1630 1635

Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile Glu Asp
1640 1645 1650

Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu His Pro
1655 1660 1665

Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val Arg Glu
1670 1675 1680

Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro Thr Arg
1685 1690 1695

Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro Ile
1700 1705 1710

Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly Arg Glu
1715 1720 1725

Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg Leu Leu
1730 1735 1740

Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met Asp Glu
1745 1750 1755

Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly Tyr Ile
1760 1765 1770

Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe Met Thr
1775 1780 1785

Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser Asn Ala
1790 1795 1800

Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser Trp Asn
1805 1810 1815

Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr Val Trp
1820 1825 1830

Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala Cys Leu

1835 1840 1845

Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys Thr Phe
1850 1855 1860

Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp Phe Val
1865 1870 1875

Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys Ala Glu
1880 1885 1890

Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile Leu Thr
1895 1900 1905

Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro Val Thr
1910 1915 1920

His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro
1925 1930 1935

Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro Leu Glu
1940 1945 1950

Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met Leu Leu
1955 1960 1965

Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met Phe Glu
1970 1975 1980

Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr Arg Leu
1985 1990 1995

Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg Arg Gly
2000 2005 2010

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gctatttgct cggcagtacc atcacattgg gttccaacaa gtcgaacaac ctggtccata 9960

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tgtaaaaaat ccgggaggcc acaaaccatg gaagctgtac gcatggcgta gtggactagc 10500

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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
20 25 30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
85 90 95

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Arg Arg Arg Ser Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Leu Met Ile Val
        115                 120                 125

Ala Lys His Glu Arg Gly Arg Pro Leu Leu Phe Lys Thr Thr Glu Gly
    130                 135                 140

Ile Asn Lys Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Glu
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro Leu Leu Val Asn Thr Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Met Tyr Gly
            180                 185                 190

Thr Cys Thr Gln Ser Gly Glu Arg Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205

Leu Thr Pro His Ser Gly Met Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Val Glu Ser Trp
225                 230                 235                 240

Ile Leu Arg Asn Pro Gly Phe Ala Leu Leu Ala Gly Phe Met Ala Tyr
                245                 250                 255

Met Ile Gly Gln Thr Gly Ile Gln Arg Thr Val Phe Phe Val Leu Met
            260                 265                 270

Met Leu Val Ala Pro Ser Tyr Gly Met Arg Cys Val Gly Val Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ala Trp Val Asp Leu Val
    290                 295                 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Gln Gly Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Thr Lys Thr Thr Ala Lys Glu Val Ala Leu Leu
                325                 330                 335

Arg Thr Tyr Cys Ile Glu Ala Ser Ile Ser Asn Ile Thr Thr Ala Thr
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Pro Tyr Leu Lys Glu Glu Gln Asp Gln
        355                 360                 365
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Gln Tyr Ile Cys Arg Arg Asp Val Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Val Val Thr Cys Ala Lys Phe Ser
385                 390                 395                 400

Cys Ser Gly Lys Ile Thr Gly Asn Leu Val Gln Ile Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Val Val Val Thr Val His Asn Gly Asp Thr His Ala Val Gly
            420                 425                 430

Asn Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser
        435                 440                 445

Pro Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp
    450                 455                 460

Cys Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys
465                 470                 475                 480

Met Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn
            500                 505                 510

Tyr Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln
        515                 520                 525

Asp Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu
    530                 535                 540

Ala Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly
                565                 570                 575

Met Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Thr Val Val Lys Val Lys Tyr Glu Gly
        595                 600                 605

Ala Gly Ala Pro Cys Lys Val Pro Ile Glu Ile Arg Asp Val Asn Lys
    610                 615                 620

Glu Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Leu Ala Glu Asn
625                 630                 635                 640
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Thr Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe
            660                 665                 670

Arg Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Val Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe
705                 710                 715                 720

Gly Ser Val Tyr Thr Thr Leu Phe Gly Gly Val Ser Trp Met Ile Arg
                725                 730                 735

Ile Leu Ile Gly Phe Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn
            740                 745                 750

Thr Ser Met Ala Met Thr Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910
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Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065

Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                1105                1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                1120                1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                1135                1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                1150                1155

Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                1165                1170
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Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                1180                1185

Ala Thr  Met Thr Gly Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
    1190                1195                1200

Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
    1205                1210                1215

Leu Leu  Arg Lys Leu Thr Ser  Arg Glu Leu Met Met  Thr Thr Ile
    1220                1225                1230

Gly Ile  Val Leu Leu Ser Gln  Ser Thr Ile Pro Glu  Thr Ile Leu
    1235                1240                1245

Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
    1250                1255                1260

Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
    1265                1270                1275

Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                1285                1290

Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                1300                1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                1315                1320

Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                1330                1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                1345                1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                1360                1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                1375                1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                1390                1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                1405                1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                1420                1425
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Met Ser  Ile Lys Asn Glu Glu  Glu Glu Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                 1555                 1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                 1570                 1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                 1585                 1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                 1600                 1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                 1615                 1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                 1630                 1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                 1645                 1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                 1660                 1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                 1675                 1680
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Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
    1685                1690                1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
    1700                1705                1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
    1715                1720                1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
    1730                1735                1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
    1745                1750                1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
    1760                1765                1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
    1775                1780                1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
    1790                1795                1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
    1805                1810                1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
    1820                1825                1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
    1835                1840                1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
    1850                1855                1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
    1865                1870                1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
    1880                1885                1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
    1895                1900                1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
    1910                1915                1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
    1925                1930                1935
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Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
    1940                1945                1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
    1955                1960                1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
    1970                1975                1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
    1985                1990                1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
    2000                2005                2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
    2015                2020                2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
    2030                2035                2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
    2045                2050                2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
    2060                2065                2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
    2075                2080                2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
    2090                2095                2100

Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Val Arg Asp Ala Leu
    2105                2110                2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
    2120                2125                2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
    2135                2140                2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
    2150                2155                2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
    2165                2170                2175

Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
    2180                2185                2190
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Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
2195 2200 2205

Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
2210 2215 2220

Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
2225 2230 2235

Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
2240 2245 2250

Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
2255 2260 2265

Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
2270 2275 2280

Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
2285 2290 2295

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
2300 2305 2310

Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
2315 2320 2325

Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
2330 2335 2340

Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Leu Phe Leu Leu Val
2345 2350 2355

Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
2360 2365 2370

Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
2375 2380 2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
2390 2395 2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
2405 2410 2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
2420 2425 2430

Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
2435 2440 2445

Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
2450 2455 2460

Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
2465 2470 2475

Leu Phe Phe Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
2480 2485 2490

Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
2495 2500 2505

Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
2510 2515 2520

Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
2525 2530 2535

Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
2540 2545 2550

Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val
2555 2560 2565

Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570 2575 2580

Gly Leu Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly
2585 2590 2595

Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
2600 2605 2610

Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
2615 2620 2625

Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
2630 2635 2640

Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
2645 2650 2655

Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
2660 2665 2670

Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
2675 2680 2685

Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
2690 2695 2700

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Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
    2705                2710                2715

Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
    2720                2725                2730

Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
    2735                2740                2745

Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
    2750                2755                2760

Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
    2765                2770                2775

His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
    2780                2785                2790

Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
    2795                2800                2805

Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp
    2810                2815                2820

Asp Val Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
    2825                2830                2835

Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
    2840                2845                2850

Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
    2855                2860                2865

Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
    2870                2875                2880

Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
    2885                2890                2895

Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
    2900                2905                2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
    2915                2920                2925

Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
    2930                2935                2940

Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
    2945                2950                2955
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Ala Lys  Gly Ser Arg Ala Ile  Trp Tyr Met Trp Leu  Gly Ala Arg
     2960                2965                2970

Phe Leu  Glu Phe Glu Ala Leu  Gly Phe Leu Asn Glu  Asp His Trp
     2975                2980                2985

Phe Ser  Arg Glu Asn Ser Leu  Ser Gly Val Glu Gly  Glu Gly Leu
     2990                2995                3000

His Lys  Leu Gly Tyr Ile Leu  Arg Asp Val Ser Lys  Lys Glu Gly
     3005                3010                3015

Gly Ala  Met Tyr Ala Asp Asp  Thr Ala Gly Trp Asp  Thr Arg Ile
     3020                3025                3030

Thr Leu  Glu Asp Leu Lys Asn  Glu Glu Met Val Thr  Asn His Met
     3035                3040                3045

Glu Gly  Glu His Lys Lys Leu  Ala Glu Ala Ile Phe  Lys Leu Thr
     3050                3055                3060

Tyr Gln  Asn Lys Val Val Arg  Val Gln Arg Pro Thr  Pro Arg Gly
     3065                3070                3075

Thr Val  Met Asp Ile Ile Ser  Arg Arg Asp Gln Arg  Gly Ser Gly
     3080                3085                3090

Gln Val  Gly Thr Tyr Gly Leu  Asn Thr Phe Thr Asn  Met Glu Ala
     3095                3100                3105

Gln Leu  Ile Arg Gln Met Glu  Gly Glu Gly Val Phe  Lys Ser Ile
     3110                3115                3120

Gln His  Leu Thr Ile Thr Glu  Glu Ile Ala Val Gln  Asn Trp Leu
     3125                3130                3135

Ala Arg  Val Gly Arg Glu Arg  Leu Ser Arg Met Ala  Ile Ser Gly
     3140                3145                3150

Asp Asp  Cys Val Val Lys Pro  Leu Asp Asp Arg Phe  Ala Ser Ala
     3155                3160                3165

Leu Thr  Ala Leu Asn Asp Met  Gly Lys Ile Arg Lys  Asp Ile Gln
     3170                3175                3180

Gln Trp  Glu Pro Ser Arg Gly  Trp Asn Asp Trp Thr  Gln Val Pro
     3185                3190                3195

Phe Cys  Ser His His Phe His  Glu Leu Ile Met Lys  Asp Gly Arg
     3200                3205                3210
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Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
3215 3220 3225

Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
3230 3235 3240

Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
3245 3250 3255

His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
3260 3265 3270

Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
3275 3280 3285

His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
3290 3295 3300

Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
3305 3310 3315

Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
3320 3325 3330

Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala
3335 3340 3345

Thr Trp Ala Lys Asn Ile Gln Ala Ala Ile Asn Gln Val Arg Ser
3350 3355 3360

Leu Ile Gly Asn Glu Glu Tyr Thr Asp Tyr Met Pro Ser Met Lys
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Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
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Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Ser Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Leu Met Ile Val
        115                 120                 125

Ala Lys His Glu Arg Gly Arg Pro Leu Leu Phe Lys Thr Thr Glu Gly
    130                 135                 140

Ile Asn Lys Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Glu
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro Leu Leu Val Asn Thr Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Met Tyr Gly
            180                 185                 190

Thr Cys Thr Gln Ser Gly Glu Arg Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205

Leu Thr Pro His Ser Gly Met Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Val Glu Ser Trp
225                 230                 235                 240

Ile Leu Arg Asn Pro Gly Phe Ala Leu Leu Ala Gly Phe Met Ala Tyr
                245                 250                 255

Met Ile Gly Gln Thr Gly Ile Gln Arg Thr Val Phe Phe Val Leu Met
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Met Leu Val Ala Pro Ser Tyr Gly Met Arg Cys Val Gly Val Gly Asn
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Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ala Trp Val Asp Leu Val
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Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Gln Gly Lys Pro Thr
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Leu Asp Phe Glu Leu Thr Lys Thr Thr Ala Lys Glu Val Ala Leu Leu
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Arg Thr Tyr Cys Ile Glu Ala Ser Ile Ser Asn Ile Thr Thr Ala Thr
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Arg Cys Pro Thr Gln Gly Glu Pro Tyr Leu Lys Glu Glu Gln Asp Gln
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Gln Tyr Ile Cys Arg Arg Asp Val Val Asp Arg Gly Trp Gly Asn Gly
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Cys Gly Leu Phe Gly Lys Gly Gly Val Val Thr Cys Ala Lys Phe Ser
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Cys Ser Gly Lys Ile Thr Gly Asn Leu Val Gln Ile Glu Asn Leu Glu
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Tyr Thr Val Val Val Thr Val His Asn Gly Asp Thr His Ala Val Gly
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Asn Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser
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Pro Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp
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Cys Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys
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Met Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
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Pro Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn
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Tyr Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln
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Asp Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu
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Ala Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala
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Gly His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly
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Met Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met

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Ala Gly Ala Pro Cys Lys Val Pro Ile Glu Ile Arg Asp Val Asn Lys
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Glu Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Leu Ala Glu Asn
625 630 635 640

Thr Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
645 650 655

Tyr Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe
660 665 670

Arg Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly
675 680 685

Ala Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser
690 695 700

Val Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe
705 710 715 720

Gly Ser Val Tyr Thr Thr Leu Phe Gly Gly Val Ser Trp Met Ile Arg
725 730 735

Ile Leu Ile Gly Phe Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn
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Thr Ser Met Ala Met Thr Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
755 760 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
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Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
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820 825 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
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Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met

850 855 860

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865 870 875 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
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Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
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Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
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Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
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Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
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Ile Glu Val Lys Asn Cys His Trp Pro Lys Ser His Thr Leu Trp Ser
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Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
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Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
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Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
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Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
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Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
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Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
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Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu

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Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
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Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
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His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
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1790 1795 1800

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Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
1820 1825 1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
1835 1840 1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
1850 1855 1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
1865 1870 1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys

1880 1885 1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
1895 1900 1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
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Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
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Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
1940 1945 1950

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1955 1960 1965

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1970 1975 1980

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1985 1990 1995

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2000 2005 2010

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Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
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Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
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His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
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SEQUENCE LISTING

<110> Takeda Vaccines, Inc.
Stinchcomb, Dan
Huang, Claire Y.
Kinney, Richard M.
Livengood, Jill A..

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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
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Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

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Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Ala Glu Pro Asp
                165                 170                 175

Asp Val Asp Cys Trp Cys Asn Ala Thr Asp Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
                245                 250                 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320
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Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
                325                 330                 335

Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Ala
        355                 360                 365

Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
385                 390                 395                 400

Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
                405                 410                 415

Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala
        435                 440                 445

Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Thr Leu Thr Leu Asp
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Thr
465                 470                 475                 480

Met Lys Glu Arg Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
            500                 505                 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
        515                 520                 525

Glu Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
                565                 570                 575

Met Ser Tyr Val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
            580                 585                 590
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Ala Glu Thr Gln His Gly Thr Val Leu Val Gln Val Lys Tyr Glu Gly
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Ala Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
625                 630                 635                 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
                645                 650                 655

Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
        675                 680                 685

Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Ile Gly Gly Val Phe Thr Ser Met Gly Lys Leu Val His Gln Val Phe
705                 710                 715                 720

Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Asn
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Thr Ser Leu Ser Met Met Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860
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Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
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Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
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Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
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Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
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Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
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Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
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Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
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Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
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His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
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Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
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Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
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Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                 1180                 1185

Ala Thr  Met Thr Asp Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
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Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
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Leu Leu  Arg Lys Leu Thr Ser  Lys Glu Leu Met Met  Thr Thr Ile
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Gly Ile  Val Leu Leu Ser Gln  Ser Thr Leu Pro Glu  Thr Ile Leu
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Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
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Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
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Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
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Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
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Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
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Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
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Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
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Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
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Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
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Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
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Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
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Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
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Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
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Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
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Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                1885                1890
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1955 1960 1965

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Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
85 90 95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
100 105 110

Met Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
115 120 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
130 135 140

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Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Ala Glu Pro Asp
                165                 170                 175

Asp Val Asp Cys Trp Cys Asn Ala Thr Asp Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
                245                 250                 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
                325                 330                 335

Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Ala
        355                 360                 365

Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
385                 390                 395                 400

Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
                405                 410                 415
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Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala
        435                 440                 445

Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Thr Leu Thr Leu Asp
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Thr
465                 470                 475                 480

Met Lys Glu Arg Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
            500                 505                 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
        515                 520                 525

Glu Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
                565                 570                 575

Met Ser Tyr Val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Val Leu Val Gln Val Lys Tyr Glu Gly
        595                 600                 605

Thr Asp Ala Pro Cys Lys Ile Pro Phe Ser Thr Gln Asp Glu Lys Gly
    610                 615                 620

Ala Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
625                 630                 635                 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
                645                 650                 655

Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
        675                 680                 685
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Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Ile Gly Gly Val Phe Thr Ser Met Gly Lys Leu Val His Gln Val Phe
705                 710                 715                 720

Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Asn
            740                 745                 750

Thr Ser Leu Ser Met Met Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960
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Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065

Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                1105                1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                1120                1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                1135                1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                1150                1155

Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                1165                1170

Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                1180                1185

Ala Thr  Met Thr Asp Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
    1190                1195                1200

Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
    1205                1210                1215
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Leu Leu  Arg Lys Leu Thr Ser  Lys Glu Leu Met Met  Thr Thr Ile
    1220                 1225                 1230

Gly Ile  Val Leu Leu Ser Gln  Ser Thr Leu Pro Glu  Thr Ile Leu
    1235                 1240                 1245

Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
    1250                 1255                 1260

Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
    1265                 1270                 1275

Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                 1285                 1290

Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                 1300                 1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                 1315                 1320

Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                 1330                 1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                 1345                 1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                 1360                 1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                 1375                 1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                 1390                 1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                 1405                 1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Asp Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470
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Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                 1555                 1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                 1570                 1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                 1585                 1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                 1600                 1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                 1615                 1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                 1630                 1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                 1645                 1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                 1660                 1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                 1675                 1680

Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                 1690                 1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
    1700                 1705                 1710

Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
    1715                 1720                 1725
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Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
    1730                  1735                  1740

Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                  1750                  1755

Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                  1765                  1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                  1780                  1785

Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
    1790                  1795                  1800

Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
    1805                  1810                  1815

Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
    1820                  1825                  1830

Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
    1835                  1840                  1845

Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
    1850                  1855                  1860

Thr Phe  Asp Ser Glu Tyr Val  Lys Thr Arg Thr Asn  Asp Trp Asp
    1865                  1870                  1875

Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                  1885                  1890

Ala Glu  Arg Val Ile Asp Pro  Arg Arg Cys Met Lys  Pro Val Ile
    1895                  1900                  1905

Leu Thr  Asp Gly Glu Glu Arg  Val Ile Leu Ala Gly  Pro Met Pro
    1910                  1915                  1920

Val Thr  His Ser Ser Ala Ala  Gln Arg Arg Gly Arg  Ile Gly Arg
    1925                  1930                  1935

Asn Pro  Lys Asn Glu Asn Asp  Gln Tyr Ile Tyr Met  Gly Glu Pro
    1940                  1945                  1950

Leu Glu  Asn Asp Glu Asp Cys  Ala His Trp Lys Glu  Ala Lys Met
    1955                  1960                  1965

Leu Leu  Asp Asn Ile Asn Thr  Pro Glu Gly Ile Ile  Pro Ser Met
    1970                  1975                  1980
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Phe Glu  Pro Glu Arg Glu Lys  Val Asp Ala Ile Asp  Gly Glu Tyr
    1985                1990                1995

Arg Leu  Arg Gly Glu Ala Arg  Lys Thr Phe Val Asp  Leu Met Arg
    2000                2005                2010

Arg Gly  Asp Leu Pro Val Trp  Leu Ala Tyr Arg Val  Ala Ala Glu
    2015                2020                2025

Gly Ile  Asn Tyr Ala Asp Arg  Arg Trp Cys Phe Asp  Gly Val Lys
    2030                2035                2040

Asn Asn  Gln Ile Leu Glu Glu  Asn Val Glu Val Glu  Ile Trp Thr
    2045                2050                2055

Lys Glu  Gly Glu Arg Lys Lys  Leu Lys Pro Arg Trp  Leu Asp Ala
    2060                2065                2070

Arg Ile  Tyr Ser Asp Pro Leu  Ala Leu Lys Glu Phe  Lys Glu Phe
    2075                2080                2085

Ala Ala  Gly Arg Lys Ser Leu  Thr Leu Asn Leu Ile  Thr Glu Met
    2090                2095                2100

Gly Arg  Leu Pro Thr Phe Met  Thr Gln Lys Ala Arg  Asp Ala Leu
    2105                2110                2115

Asp Asn  Leu Ala Val Leu His  Thr Ala Glu Ala Gly  Gly Arg Ala
    2120                2125                2130

Tyr Asn  His Ala Leu Ser Glu  Leu Pro Glu Thr Leu  Glu Thr Leu
    2135                2140                2145

Leu Leu  Leu Thr Leu Leu Ala  Thr Val Thr Gly Gly  Ile Phe Leu
    2150                2155                2160

Phe Leu  Met Ser Ala Arg Gly  Ile Gly Lys Met Thr  Leu Gly Met
    2165                2170                2175

Cys Cys  Ile Ile Thr Ala Ser  Ile Leu Leu Trp Tyr  Ala Gln Ile
    2180                2185                2190

Gln Pro  His Trp Ile Ala Ala  Ser Ile Ile Leu Glu  Phe Phe Leu
    2195                2200                2205

Ile Val  Leu Leu Ile Pro Glu  Pro Glu Lys Gln Arg  Thr Pro Gln
    2210                2215                2220

Asp Asn  Gln Leu Thr Tyr Val  Val Ile Ala Ile Leu  Thr Val Val
    2225                2230                2235
```

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Ala Ala  Thr Met Ala Asn Glu  Met Gly Phe Leu Glu  Lys Thr Lys
    2240                2245                2250

Lys Asp  Leu Gly Leu Gly Ser  Ile Ala Thr Gln Gln  Pro Glu Ser
    2255                2260                2265

Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                2275                2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                2290                2295

Ile Glu  Asn Ser Ser Val Asn  Val Ser Leu Thr Ala  Ile Ala Asn
    2300                2305                2310

Gln Ala  Thr Val Leu Met Gly  Leu Gly Lys Gly Trp  Pro Leu Ser
    2315                2320                2325

Lys Met  Asp Ile Gly Val Pro  Leu Leu Ala Ile Gly  Cys Tyr Ser
    2330                2335                2340

Gln Val  Asn Pro Ile Thr Leu  Thr Ala Ala Leu Phe  Leu Leu Val
    2345                2350                2355

Ala His  Tyr Ala Ile Ile Gly  Pro Gly Leu Gln Ala  Lys Ala Thr
    2360                2365                2370

Arg Glu  Ala Gln Lys Arg Ala  Ala Ala Gly Ile Met  Lys Asn Pro
    2375                2380                2385

Thr Val  Asp Gly Ile Thr Val  Ile Asp Leu Asp Pro  Ile Pro Tyr
    2390                2395                2400

Asp Pro  Lys Phe Glu Lys Gln  Leu Gly Gln Val Met  Leu Leu Val
    2405                2410                2415

Leu Cys  Val Thr Gln Val Leu  Met Met Arg Thr Thr  Trp Ala Leu
    2420                2425                2430

Cys Glu  Ala Leu Thr Leu Ala  Thr Gly Pro Ile Ser  Thr Leu Trp
    2435                2440                2445

Glu Gly  Asn Pro Gly Arg Phe  Trp Asn Thr Thr Ile  Ala Val Ser
    2450                2455                2460

Met Ala  Asn Ile Phe Arg Gly  Ser Tyr Leu Ala Gly  Ala Gly Leu
    2465                2470                2475

Leu Phe  Ser Ile Met Lys Asn  Thr Thr Asn Thr Arg  Arg Gly Thr
    2480                2485                2490
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Gly Asn  Ile Gly Glu Thr Leu  Gly Glu Lys Trp Lys  Ser Arg Leu
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Asn Ala  Leu Gly Lys Ser Glu  Phe Gln Ile Tyr Lys  Lys Ser Gly
    2510                 2515                 2520

Ile Gln  Glu Val Asp Arg Thr  Leu Ala Lys Glu Gly  Ile Lys Arg
    2525                 2530                 2535

Gly Glu  Thr Asp His His Ala  Val Ser Arg Gly Ser  Ala Lys Leu
    2540                 2545                 2550

Arg Trp  Phe Val Glu Arg Asn  Met Val Thr Pro Glu  Gly Lys Val
    2555                 2560                 2565

Val Asp  Leu Gly Cys Gly Arg  Gly Gly Trp Ser Tyr  Tyr Cys Gly
    2570                 2575                 2580

Gly Leu  Lys Asn Val Arg Glu  Val Lys Gly Leu Thr  Lys Gly Gly
    2585                 2590                 2595

Pro Gly  His Glu Glu Pro Ile  Pro Met Ser Thr Tyr  Gly Trp Asn
    2600                 2605                 2610

Leu Val  Arg Leu Gln Ser Gly  Val Asp Val Phe Phe  Ile Pro Pro
    2615                 2620                 2625

Glu Lys  Cys Asp Thr Leu Leu  Cys Asp Ile Gly Glu  Ser Ser Pro
    2630                 2635                 2640

Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
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Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
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Met Asn Asn Gln Arg Lys Lys Ala Lys Asn Thr Pro Phe Asn Met Leu
1               5                  10                  15

Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Ala Glu Pro Asp
                165                 170                 175

Asp Val Asp Cys Trp Cys Asn Ala Thr Asp Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205
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Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
                245                 250                 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
                325                 330                 335

Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Ala
        355                 360                 365

Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
385                 390                 395                 400

Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
                405                 410                 415

Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala
        435                 440                 445

Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Thr Leu Thr Leu Asp
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Thr
465                 470                 475                 480
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Met Lys Glu Arg Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
            500                 505                 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
        515                 520                 525

Glu Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
                565                 570                 575

Met Ser Tyr Val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Val Leu Val Gln Val Lys Tyr Glu Gly
        595                 600                 605

Thr Asp Ala Pro Cys Lys Ile Pro Phe Ser Thr Gln Asp Glu Lys Gly
    610                 615                 620

Ala Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
625                 630                 635                 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
                645                 650                 655

Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
        675                 680                 685

Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Ile Gly Gly Val Phe Thr Ser Met Gly Lys Leu Val His Gln Val Phe
705                 710                 715                 720

Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Asn
            740                 745                 750
```

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Thr Ser Leu Ser Met Met Cys Ile Ala Ala Xaa Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020
```

Gly Pro Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln
1025 1030 1035

Ile Thr Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp
1040 1045 1050

Phe Cys Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
1070 1075 1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
1085 1090 1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
1115 1120 1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
1130 1135 1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
1145 1150 1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
1160 1165 1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
1175 1180 1185

Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
1190 1195 1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
1205 1210 1215

Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
1220 1225 1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Leu Pro Glu Thr Ile Leu
1235 1240 1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
1250 1255 1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
1265 1270 1275

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Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                 1285                 1290

Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                 1300                 1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                 1315                 1320

Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                 1330                 1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                 1345                 1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                 1360                 1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                 1375                 1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                 1390                 1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                 1405                 1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Asp Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530
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Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
1535 1540 1545

Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
1550 1555 1560

Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
1565 1570 1575

Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
1580 1585 1590

Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
1595 1600 1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
1610 1615 1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
1625 1630 1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
1640 1645 1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
1655 1660 1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
1670 1675 1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
1685 1690 1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
1700 1705 1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
1715 1720 1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
1730 1735 1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
1745 1750 1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
1760 1765 1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
1775 1780 1785

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Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
    1790                1795                1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
    1805                1810                1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
    1820                1825                1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
    1835                1840                1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
    1850                1855                1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
    1865                1870                1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
    1880                1885                1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
    1895                1900                1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
    1910                1915                1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
    1925                1930                1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
    1940                1945                1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
    1955                1960                1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
    1970                1975                1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
    1985                1990                1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
    2000                2005                2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
    2015                2020                2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
    2030                2035                2040
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Asn Asn  Gln Ile Leu Glu Glu  Asn Val Glu Val Glu  Ile Trp Thr
    2045                 2050                 2055

Lys Glu  Gly Glu Arg Lys Lys  Leu Lys Pro Arg Trp  Leu Asp Ala
    2060                 2065                 2070

Arg Ile  Tyr Ser Asp Pro Leu  Ala Leu Lys Glu Phe  Lys Glu Phe
    2075                 2080                 2085

Ala Ala  Gly Arg Lys Ser Leu  Thr Leu Asn Leu Ile  Thr Glu Met
    2090                 2095                 2100

Gly Arg  Leu Pro Thr Phe Met  Thr Gln Lys Ala Arg  Asp Ala Leu
    2105                 2110                 2115

Asp Asn  Leu Ala Val Leu His  Thr Ala Glu Ala Gly  Gly Arg Ala
    2120                 2125                 2130

Tyr Asn  His Ala Leu Ser Glu  Leu Pro Glu Thr Leu  Glu Thr Leu
    2135                 2140                 2145

Leu Leu  Leu Thr Leu Leu Ala  Thr Val Thr Gly Gly  Ile Phe Leu
    2150                 2155                 2160

Phe Leu  Met Ser Ala Arg Gly  Ile Gly Lys Met Thr  Leu Gly Met
    2165                 2170                 2175

Cys Cys  Ile Ile Thr Ala Ser  Ile Leu Leu Trp Tyr  Ala Gln Ile
    2180                 2185                 2190

Gln Pro  His Trp Ile Ala Ala  Ser Ile Ile Leu Glu  Phe Phe Leu
    2195                 2200                 2205

Ile Val  Leu Leu Ile Pro Glu  Pro Glu Lys Gln Arg  Thr Pro Gln
    2210                 2215                 2220

Asp Asn  Gln Leu Thr Tyr Val  Val Ile Ala Ile Leu  Thr Val Val
    2225                 2230                 2235

Ala Ala  Thr Met Ala Asn Glu  Met Gly Phe Leu Glu  Lys Thr Lys
    2240                 2245                 2250

Lys Asp  Leu Gly Leu Gly Ser  Ile Ala Thr Gln Gln  Pro Glu Ser
    2255                 2260                 2265

Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                 2275                 2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                 2290                 2295
```

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
2300 2305 2310

Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
2315 2320 2325

Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
2330 2335 2340

Gln Val Asn Pro Ile Thr Leu Ile Ala Ala Leu Phe Leu Leu Val
2345 2350 2355

Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
2360 2365 2370

Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
2375 2380 2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
2390 2395 2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
2405 2410 2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
2420 2425 2430

Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
2435 2440 2445

Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
2450 2455 2460

Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
2465 2470 2475

Leu Phe Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
2480 2485 2490

Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
2495 2500 2505

Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
2510 2515 2520

Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
2525 2530 2535

Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
2540 2545 2550

Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val
2555 2560 2565

Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570 2575 2580

Gly Leu Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly
2585 2590 2595

Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
2600 2605 2610

Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
2615 2620 2625

Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
2630 2635 2640

Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
2645 2650 2655

Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
2660 2665 2670

Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
2675 2680 2685

Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
2690 2695 2700

Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
2705 2710 2715

Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
2720 2725 2730

Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
2735 2740 2745

Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
2750 2755 2760

Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
2765 2770 2775

His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
2780 2785 2790

Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
2795 2800 2805

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Ser Ser  Met Val Asn Gly Val  Val Arg Leu Leu Thr  Lys Pro Trp
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Asp Val  Val Pro Met Val Thr  Gln Met Ala Met Thr  Asp Thr Thr
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Pro Phe  Gly Gln Gln Arg Val  Phe Lys Glu Lys Val  Asp Thr Arg
    2840                 2845                 2850

Thr Gln  Glu Pro Lys Glu Gly  Thr Lys Lys Leu Met  Lys Ile Thr
    2855                 2860                 2865

Ala Glu  Trp Leu Trp Lys Glu  Leu Gly Lys Lys Lys  Thr Pro Arg
    2870                 2875                 2880

Met Cys  Thr Arg Glu Glu Phe  Thr Arg Lys Val Arg  Ser Asn Ala
    2885                 2890                 2895

Ala Leu  Gly Ala Ile Phe Thr  Asp Glu Asn Lys Trp  Lys Ser Ala
    2900                 2905                 2910

Arg Glu  Ala Val Glu Asp Ser  Arg Phe Trp Glu Leu  Val Asp Lys
    2915                 2920                 2925

Glu Arg  Asn Leu His Leu Glu  Gly Lys Cys Glu Thr  Cys Val Tyr
    2930                 2935                 2940

Asn Met  Met Gly Lys Arg Glu  Lys Lys Leu Gly Glu  Phe Gly Lys
    2945                 2950                 2955

Ala Lys  Gly Ser Arg Ala Ile  Trp Tyr Met Trp Leu  Gly Ala Arg
    2960                 2965                 2970

Phe Leu  Glu Phe Glu Ala Leu  Gly Phe Leu Asn Glu  Asp His Trp
    2975                 2980                 2985

Phe Ser  Arg Glu Asn Ser Leu  Ser Gly Val Glu Gly  Glu Gly Leu
    2990                 2995                 3000

His Lys  Leu Gly Tyr Ile Leu  Arg Asp Val Ser Lys  Lys Glu Gly
    3005                 3010                 3015

Gly Ala  Met Tyr Ala Asp Asp  Thr Ala Gly Trp Asp  Thr Arg Ile
    3020                 3025                 3030

Thr Leu  Glu Asp Leu Lys Asn  Glu Glu Met Val Thr  Asn His Met
    3035                 3040                 3045

Glu Gly  Glu His Lys Lys Leu  Ala Glu Ala Ile Phe  Lys Leu Thr
    3050                 3055                 3060
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Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
    3065                3070                3075

Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
    3080                3085                3090

Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
    3095                3100                3105

Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
    3110                3115                3120

Gln His Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu
    3125                3130                3135

Ala Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
    3140                3145                3150

Asp Asp Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala
    3155                3160                3165

Leu Thr Ala Leu Asn Asp Met Gly Lys Ile Arg Lys Asp Ile Gln
    3170                3175                3180

Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
    3185                3190                3195

Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
    3200                3205                3210

Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
    3215                3220                3225

Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
    3230                3235                3240

Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
    3245                3250                3255

His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
    3260                3265                3270

Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
    3275                3280                3285

His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
    3290                3295                3300

Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
    3305                3310                3315
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Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
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Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala
3335 3340 3345

Thr Trp Ala Lys Asn Ile Gln Ala Ala Ile Asn Gln Val Arg Ser
3350 3355 3360

Leu Ile Gly Asn Glu Glu Tyr Thr Asp Tyr Met Pro Ser Met Lys
3365 3370 3375

Arg Phe Arg Arg Glu Glu Glu Glu Ala Gly Val Leu Trp Lys Ala
3380 3385 3390

Lys Leu Thr Asn Lys Ala Arg Ser Gln Val Gly Leu Ser His Ser
3395 3400 3405

Thr Glu Lys Thr Met Leu Pro Val Ser Pro Val Gln Gly Arg Lys
3410 3415 3420

Lys Ser Gly His His Lys Cys His Ser Leu Ser Lys Leu Cys Ser
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Leu Leu His Leu Arg Arg Cys Lys Lys Ser Gly Arg Pro Gln Thr
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Met Glu Ala Val Arg Met Ala Trp Thr Ser Gly
3455 3460

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ctgacaaaga gattctcact tggaatgctg cagggacgag gaccattaaa actgttcatg 240

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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Ala Glu Pro Asp
                165                 170                 175

Asp Val Asp Cys Trp Cys Asn Ala Thr Asp Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220
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Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
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Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
                245                 250                 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
                325                 330                 335

Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Ala
        355                 360                 365

Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
385                 390                 395                 400

Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
                405                 410                 415

Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala
        435                 440                 445

Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Thr Leu Thr Leu Asp
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Thr
465                 470                 475                 480

Met Lys Glu Arg Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495
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Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
            500                 505                 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
        515                 520                 525

Glu Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
                565                 570                 575

Met Ser Tyr Val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Val Leu Val Gln Val Lys Tyr Glu Gly
        595                 600                 605

Thr Asp Ala Pro Cys Lys Ile Pro Phe Ser Thr Gln Asp Glu Lys Gly
    610                 615                 620

Ala Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
625                 630                 635                 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
                645                 650                 655

Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
        675                 680                 685

Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Ile Gly Gly Val Phe Thr Ser Met Gly Lys Leu Val His Gln Val Phe
705                 710                 715                 720

Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Asn
            740                 745                 750

Thr Ser Leu Ser Met Met Cys Ile Ala Ala Ala Ile Val Thr Leu Tyr
        755                 760                 765
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Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
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Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
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Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
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Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
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Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                1105                1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                1120                1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                1135                1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                1150                1155

Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                1165                1170

Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                1180                1185

Ala Thr  Met Thr Asp Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
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Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
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Leu Leu  Arg Lys Leu Thr Ser  Lys Glu Leu Met Met  Thr Thr Ile
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Gly Ile  Val Leu Leu Ser Gln  Ser Thr Leu Pro Glu  Thr Ile Leu
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Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
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Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
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Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                1285                1290
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Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                 1300                 1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                 1315                 1320

Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                 1330                 1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                 1345                 1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                 1360                 1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                 1375                 1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                 1390                 1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                 1405                 1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Asp Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545
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Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                1555                1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                1570                1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                1585                1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                1600                1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                1615                1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                1630                1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                1645                1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                1660                1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                1675                1680

Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                1690                1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
    1700                1705                1710

Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
    1715                1720                1725

Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
    1730                1735                1740

Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                1750                1755

Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                1765                1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                1780                1785

Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
    1790                1795                1800
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Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
    1805                 1810                 1815

Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
    1820                 1825                 1830

Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
    1835                 1840                 1845

Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
    1850                 1855                 1860

Thr Phe  Asp Ser Glu Tyr Val  Lys Thr Arg Thr Asn  Asp Trp Asp
    1865                 1870                 1875

Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                 1885                 1890

Ala Glu  Arg Val Ile Asp Pro  Arg Arg Cys Met Lys  Pro Val Ile
    1895                 1900                 1905

Leu Thr  Asp Gly Glu Glu Arg  Val Ile Leu Ala Gly  Pro Met Pro
    1910                 1915                 1920

Val Thr  His Ser Ser Ala Ala  Gln Arg Arg Gly Arg  Ile Gly Arg
    1925                 1930                 1935

Asn Pro  Lys Asn Glu Asn Asp  Gln Tyr Ile Tyr Met  Gly Glu Pro
    1940                 1945                 1950

Leu Glu  Asn Asp Glu Asp Cys  Ala His Trp Lys Glu  Ala Lys Met
    1955                 1960                 1965

Leu Leu  Asp Asn Ile Asn Thr  Pro Glu Gly Ile Ile  Pro Ser Met
    1970                 1975                 1980

Phe Glu  Pro Glu Arg Glu Lys  Val Asp Ala Ile Asp  Gly Glu Tyr
    1985                 1990                 1995

Arg Leu  Arg Gly Glu Ala Arg  Lys Thr Phe Val Asp  Leu Met Arg
    2000                 2005                 2010

Arg Gly  Asp Leu Pro Val Trp  Leu Ala Tyr Arg Val  Ala Ala Glu
    2015                 2020                 2025

Gly Ile  Asn Tyr Ala Asp Arg  Arg Trp Cys Phe Asp  Gly Val Lys
    2030                 2035                 2040

Asn Asn  Gln Ile Leu Glu Glu  Asn Val Glu Val Glu  Ile Trp Thr
    2045                 2050                 2055
```

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Lys Glu  Gly Glu Arg Lys Lys  Leu Lys Pro Arg Trp  Leu Asp Ala
    2060                 2065                 2070

Arg Ile  Tyr Ser Asp Pro Leu  Ala Leu Lys Glu Phe  Lys Glu Phe
    2075                 2080                 2085

Ala Ala  Gly Arg Lys Ser Leu  Thr Leu Asn Leu Ile  Thr Glu Met
    2090                 2095                 2100

Gly Arg  Leu Pro Thr Phe Met  Thr Gln Lys Ala Arg  Asp Ala Leu
    2105                 2110                 2115

Asp Asn  Leu Ala Val Leu His  Thr Ala Glu Ala Gly  Gly Arg Ala
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Tyr Asn  His Ala Leu Ser Glu  Leu Pro Glu Thr Leu  Glu Thr Leu
    2135                 2140                 2145

Leu Leu  Leu Thr Leu Leu Ala  Thr Val Thr Gly Gly  Ile Phe Leu
    2150                 2155                 2160

Phe Leu  Met Ser Ala Arg Gly  Ile Gly Lys Met Thr  Leu Gly Met
    2165                 2170                 2175

Cys Cys  Ile Ile Thr Ala Ser  Ile Leu Leu Trp Tyr  Ala Gln Ile
    2180                 2185                 2190

Gln Pro  His Trp Ile Ala Ala  Ser Ile Ile Leu Glu  Phe Phe Leu
    2195                 2200                 2205

Ile Val  Leu Leu Ile Pro Glu  Pro Glu Lys Gln Arg  Thr Pro Gln
    2210                 2215                 2220

Asp Asn  Gln Leu Thr Tyr Val  Val Ile Ala Ile Leu  Thr Val Val
    2225                 2230                 2235

Ala Ala  Thr Met Ala Asn Glu  Met Gly Phe Leu Glu  Lys Thr Lys
    2240                 2245                 2250

Lys Asp  Leu Gly Leu Gly Ser  Ile Ala Thr Gln Gln  Pro Glu Ser
    2255                 2260                 2265

Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                 2275                 2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                 2290                 2295

Ile Glu  Asn Ser Ser Val Asn  Val Ser Leu Thr Ala  Ile Ala Asn
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```

```
Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
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Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
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Gln Val Asn Pro Ile Thr Leu Ile Ala Ala Leu Phe Leu Leu Val
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Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
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Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
    2375                2380                2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
    2390                2395                2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
    2405                2410                2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
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Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
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Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
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Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
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Leu Phe Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
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Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
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Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
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Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
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Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
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Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val
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Val Asp  Leu Gly Cys Gly Arg  Gly Gly Trp Ser Tyr  Tyr Cys Gly
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Gly Leu  Lys Asn Val Arg Glu  Val Lys Gly Leu Thr  Lys Gly Gly
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Pro Gly  His Glu Glu Pro Ile  Pro Met Ser Thr Tyr  Gly Trp Asn
    2600                 2605                 2610

Leu Val  Arg Leu Gln Ser Gly  Val Asp Val Phe Phe  Ile Pro Pro
    2615                 2620                 2625

Glu Lys  Cys Asp Thr Leu Leu  Cys Asp Ile Gly Glu  Ser Ser Pro
    2630                 2635                 2640

Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
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Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
    2660                 2665                 2670

Leu Asn  Pro Tyr Met Pro Ser  Val Ile Glu Lys Met  Glu Ala Leu
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Gln Arg  Lys Tyr Gly Gly Ala  Leu Val Arg Asn Pro  Leu Ser Arg
    2690                 2695                 2700

Asn Ser  Thr His Glu Met Tyr  Trp Val Ser Asn Ala  Ser Gly Asn
    2705                 2710                 2715

Ile Val  Ser Ser Val Asn Met  Ile Ser Arg Met Leu  Ile Asn Arg
    2720                 2725                 2730

Phe Thr  Met Arg Tyr Lys Lys  Ala Thr Tyr Glu Pro  Asp Val Asp
    2735                 2740                 2745

Leu Gly  Ser Gly Thr Arg Asn  Ile Gly Ile Glu Ser  Glu Ile Pro
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Asn Leu  Asp Ile Ile Gly Lys  Arg Ile Glu Lys Ile  Lys Gln Glu
    2765                 2770                 2775

His Glu  Thr Ser Trp His Tyr  Asp Gln Asp His Pro  Tyr Lys Thr
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Trp Ala  Tyr His Gly Ser Tyr  Glu Thr Lys Gln Thr  Gly Ser Ala
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Ser Ser  Met Val Asn Gly Val  Val Arg Leu Leu Thr  Lys Pro Trp
    2810                 2815                 2820
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Asp Val  Val Pro Met Val Thr  Gln Met Ala Met Thr  Asp Thr Thr
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Pro Phe  Gly Gln Gln Arg Val  Phe Lys Glu Lys Val  Asp Thr Arg
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Thr Gln  Glu Pro Lys Glu Gly  Thr Lys Lys Leu Met  Lys Ile Thr
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Ala Glu  Trp Leu Trp Lys Glu  Leu Gly Lys Lys Lys  Thr Pro Arg
    2870                2875                2880

Met Cys  Thr Arg Glu Glu Phe  Thr Arg Lys Val Arg  Ser Asn Ala
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Ala Leu  Gly Ala Ile Phe Thr  Asp Glu Asn Lys Trp  Lys Ser Ala
    2900                2905                2910

Arg Glu  Ala Val Glu Asp Ser  Arg Phe Trp Glu Leu  Val Asp Lys
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Glu Arg  Asn Leu His Leu Glu  Gly Lys Cys Glu Thr  Cys Val Tyr
    2930                2935                2940

Asn Met  Met Gly Lys Arg Glu  Lys Lys Leu Gly Glu  Phe Gly Lys
    2945                2950                2955

Ala Lys  Gly Ser Arg Ala Ile  Trp Tyr Met Trp Leu  Gly Ala Arg
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Phe Leu  Glu Phe Glu Ala Leu  Gly Phe Leu Asn Glu  Asp His Trp
    2975                2980                2985

Phe Ser  Arg Glu Asn Ser Leu  Ser Gly Val Glu Gly  Glu Gly Leu
    2990                2995                3000

His Lys  Leu Gly Tyr Ile Leu  Arg Asp Val Ser Lys  Lys Glu Gly
    3005                3010                3015

Gly Ala  Met Tyr Ala Asp Asp  Thr Ala Gly Trp Asp  Thr Arg Ile
    3020                3025                3030

Thr Leu  Glu Asp Leu Lys Asn  Glu Glu Met Val Thr  Asn His Met
    3035                3040                3045

Glu Gly  Glu His Lys Lys Leu  Ala Glu Ala Ile Phe  Lys Leu Thr
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Tyr Gln  Asn Lys Val Val Arg  Val Gln Arg Pro Thr  Pro Arg Gly
    3065                3070                3075
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Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
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Gln His Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu
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Ala Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
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Asp Asp Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala
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Leu Thr Ala Leu Asn Asp Met Gly Lys Ile Arg Lys Asp Ile Gln
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Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
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Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
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Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
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Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
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Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
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His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
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Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
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His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
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Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
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Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Arg Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Val Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Ile Thr Tyr Glu Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Thr Thr Met Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205

Leu Val Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Val Gln Arg Ile Glu Thr Trp
225                 230                 235                 240

Ile Leu Arg His Pro Gly Phe Thr Met Met Ala Ala Ile Leu Ala Tyr
                245                 250                 255
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Thr Ile Gly Thr Thr His Phe Gln Arg Ala Leu Ile Phe Ile Leu Leu
            260                 265                 270

Thr Ala Val Thr Pro Ser Met Thr Met Arg Cys Ile Gly Met Ser Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Ile Lys Thr Glu Ala Lys Gln Pro Ala Thr Leu
                325                 330                 335

Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Glu Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
        355                 360                 365

Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Arg
385                 390                 395                 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu His Ala Val Gly
            420                 425                 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Ile Thr Pro Gln Ser
        435                 440                 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465                 470                 475                 480

Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
            500                 505                 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
        515                 520                 525
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Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
                565                 570                 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
        595                 600                 605

Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
    610                 615                 620

Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
625                 630                 635                 640

Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Asn Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
705                 710                 715                 720

Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Leu Ile Gly Val Ile Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
            740                 745                 750

Thr Ser Leu Ser Val Thr Leu Val Leu Val Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800
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His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065
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Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
    1070                1075                1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
    1085                1090                1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
    1100                1105                1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
    1115                1120                1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
    1130                1135                1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
    1145                1150                1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
    1160                1165                1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
    1175                1180                1185

Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
    1190                1195                1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
    1205                1210                1215

Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
    1220                1225                1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
    1235                1240                1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
    1250                1255                1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
    1265                1270                1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
    1280                1285                1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
    1295                1300                1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
    1310                1315                1320
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Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
1325                 1330                 1335

Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
1340                 1345                 1350

Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
1355                 1360                 1365

Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
1370                 1375                 1380

Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
1385                 1390                 1395

Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
1400                 1405                 1410

Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
1415                 1420                 1425

Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
1430                 1435                 1440

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
1445                 1450                 1455

Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
1460                 1465                 1470

Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
1475                 1480                 1485

Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
1490                 1495                 1500

Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
1505                 1510                 1515

Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
1520                 1525                 1530

Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
1535                 1540                 1545

Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
1550                 1555                 1560

Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
1565                 1570                 1575
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Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                 1585                 1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                 1600                 1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                 1615                 1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                 1630                 1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                 1645                 1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                 1660                 1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                 1675                 1680

Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                 1690                 1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
    1700                 1705                 1710

Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
    1715                 1720                 1725

Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
    1730                 1735                 1740

Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                 1750                 1755

Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                 1765                 1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                 1780                 1785

Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
    1790                 1795                 1800

Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
    1805                 1810                 1815

Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
    1820                 1825                 1830
```

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
1835 1840 1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
1850 1855 1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
1865 1870 1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
1880 1885 1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
1895 1900 1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
1910 1915 1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
1925 1930 1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
1940 1945 1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
1955 1960 1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
1970 1975 1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
1985 1990 1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
2000 2005 2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
2015 2020 2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
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Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
2060 2065 2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
2075 2080 2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
2090 2095 2100

Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asp Ala Leu
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Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
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Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
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Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
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Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
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Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
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Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
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Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
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2285 2290 2295

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acctgggcaa agaacatcca agcagcaata aatcaagtta gatcccttat aggcaatgaa 10200

gaatacacag attacatgcc atccatgaaa agattcagaa gagaagagga agaagcagga 10260

gttctgtggt agaaagcaaa actaacatga aacaaggcta gaagtcaggt cggattaagc 10320

catagtacgg aaaaaactat gctacctgtg agccccgtcc aaggacgtta aaagaagtca 10380

ggccatcata aatgccatag cttgagtaaa ctatgcagcc tgtagctcca cctgagaagg 10440

tgtaaaaaat ccgggaggcc acaaaccatg gaagctgtac gcatggcgta gtggactagc 10500

ggttagagga gacccctccc ttacaaatcg cagcaacaat gggggcccaa ggcgagatga 10560

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Met Asn Asn Gln Arg Lys Lys Ala Lys Asn Thr Pro Phe Asn Met Leu
1 5 10 15

Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
20 25 30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

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Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Arg Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Val Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Ile Thr Tyr Glu Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Thr Thr Met Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205

Leu Val Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Val Gln Arg Ile Glu Thr Trp
225                 230                 235                 240

Ile Leu Arg His Pro Gly Phe Thr Met Met Ala Ala Ile Leu Ala Tyr
                245                 250                 255

Thr Ile Gly Thr Thr His Phe Gln Arg Ala Leu Ile Phe Ile Leu Leu
            260                 265                 270

Thr Ala Val Thr Pro Ser Met Thr Met Arg Cys Ile Gly Met Ser Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Ile Lys Thr Glu Ala Lys Gln Pro Ala Thr Leu
                325                 330                 335

Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Glu Ser
            340                 345                 350
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Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
        355                 360                 365

Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Arg
385                 390                 395                 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu His Ala Val Gly
            420                 425                 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Ile Thr Pro Gln Ser
        435                 440                 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465                 470                 475                 480

Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
            500                 505                 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
        515                 520                 525

Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
                565                 570                 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
        595                 600                 605

Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
    610                 615                 620
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Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
625                 630                 635                 640

Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Asn Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
705                 710                 715                 720

Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Leu Ile Gly Val Ile Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
            740                 745                 750

Thr Ser Leu Ser Val Thr Leu Val Leu Val Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895
```

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Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065

Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                1105                1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                1120                1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                1135                1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                1150                1155
```

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Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                1165                1170

Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                1180                1185

Ala Thr  Met Thr Asp Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
    1190                1195                1200

Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
    1205                1210                1215

Leu Leu  Arg Lys Leu Thr Ser  Lys Glu Leu Met Met  Thr Thr Ile
    1220                1225                1230

Gly Ile  Val Leu Leu Ser Gln  Ser Thr Ile Pro Glu  Thr Ile Leu
    1235                1240                1245

Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
    1250                1255                1260

Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
    1265                1270                1275

Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                1285                1290

Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                1300                1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                1315                1320

Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                1330                1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                1345                1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                1360                1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                1375                1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                1390                1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                1405                1410
```

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Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Glu Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                 1555                 1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                 1570                 1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                 1585                 1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                 1600                 1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                 1615                 1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                 1630                 1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                 1645                 1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                 1660                 1665
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His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                 1675                 1680

Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                 1690                 1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
    1700                 1705                 1710

Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
    1715                 1720                 1725

Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
    1730                 1735                 1740

Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                 1750                 1755

Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                 1765                 1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                 1780                 1785

Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
    1790                 1795                 1800

Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
    1805                 1810                 1815

Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
    1820                 1825                 1830

Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
    1835                 1840                 1845

Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
    1850                 1855                 1860

Thr Phe  Asp Ser Glu Tyr Val  Lys Thr Arg Thr Asn  Asp Trp Asp
    1865                 1870                 1875

Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                 1885                 1890

Ala Glu  Arg Val Ile Asp Pro  Arg Arg Cys Met Lys  Pro Val Ile
    1895                 1900                 1905

Leu Thr  Asp Gly Glu Glu Arg  Val Ile Leu Ala Gly  Pro Met Pro
    1910                 1915                 1920
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Val Thr  His Ser Ser Ala Ala  Gln Arg Arg Gly Arg  Ile Gly Arg
    1925                1930                1935

Asn Pro  Lys Asn Glu Asn Asp  Gln Tyr Ile Tyr Met  Gly Glu Pro
    1940                1945                1950

Leu Glu  Asn Asp Glu Asp Cys  Ala His Trp Lys Glu  Ala Lys Met
    1955                1960                1965

Leu Leu  Asp Asn Ile Asn Thr  Pro Glu Gly Ile Ile  Pro Ser Met
    1970                1975                1980

Phe Glu  Pro Glu Arg Glu Lys  Val Asp Ala Ile Asp  Gly Glu Tyr
    1985                1990                1995

Arg Leu  Arg Gly Glu Ala Arg  Lys Thr Phe Val Asp  Leu Met Arg
    2000                2005                2010

Arg Gly  Asp Leu Pro Val Trp  Leu Ala Tyr Arg Val  Ala Ala Glu
    2015                2020                2025

Gly Ile  Asn Tyr Ala Asp Arg  Arg Trp Cys Phe Asp  Gly Val Lys
    2030                2035                2040

Asn Asn  Gln Ile Leu Glu Glu  Asn Val Glu Val Glu  Ile Trp Thr
    2045                2050                2055

Lys Glu  Gly Glu Arg Lys Lys  Leu Lys Pro Arg Trp  Leu Asp Ala
    2060                2065                2070

Arg Ile  Tyr Ser Asp Pro Leu  Ala Leu Lys Glu Phe  Lys Glu Phe
    2075                2080                2085

Ala Ala  Gly Arg Lys Ser Leu  Thr Leu Asn Leu Ile  Thr Glu Met
    2090                2095                2100

Gly Arg  Leu Pro Thr Phe Met  Thr Gln Lys Ala Arg  Asp Ala Leu
    2105                2110                2115

Asp Asn  Leu Ala Val Leu His  Thr Ala Glu Ala Gly  Gly Arg Ala
    2120                2125                2130

Tyr Asn  His Ala Leu Ser Glu  Leu Pro Glu Thr Leu  Glu Thr Leu
    2135                2140                2145

Leu Leu  Leu Thr Leu Leu Ala  Thr Val Thr Gly Gly  Ile Phe Leu
    2150                2155                2160

Phe Leu  Met Ser Ala Arg Gly  Ile Gly Lys Met Thr  Leu Gly Met
    2165                2170                2175
```

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Cys Cys  Ile Ile Thr Ala Ser  Ile Leu Leu Trp Tyr  Ala Gln Ile
    2180                 2185                 2190

Gln Pro  His Trp Ile Ala Ala  Ser Ile Ile Leu Glu  Phe Phe Leu
    2195                 2200                 2205

Ile Val  Leu Leu Ile Pro Glu  Pro Glu Lys Gln Arg  Thr Pro Gln
    2210                 2215                 2220

Asp Asn  Gln Leu Thr Tyr Val  Val Ile Ala Ile Leu  Thr Val Val
    2225                 2230                 2235

Ala Ala  Thr Met Ala Asn Glu  Met Gly Phe Leu Glu  Lys Thr Lys
    2240                 2245                 2250

Lys Asp  Leu Gly Leu Gly Ser  Ile Ala Thr Gln Gln  Pro Glu Ser
    2255                 2260                 2265

Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                 2275                 2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                 2290                 2295

Ile Glu  Asn Ser Ser Val Asn  Val Ser Leu Thr Ala  Ile Ala Asn
    2300                 2305                 2310

Gln Ala  Thr Val Leu Met Gly  Leu Gly Lys Gly Trp  Pro Leu Ser
    2315                 2320                 2325

Lys Met  Asp Ile Gly Val Pro  Leu Leu Ala Ile Gly  Cys Tyr Ser
    2330                 2335                 2340

Gln Val  Asn Pro Ile Thr Leu  Thr Ala Ala Leu Phe  Leu Leu Val
    2345                 2350                 2355

Ala His  Tyr Ala Ile Ile Gly  Pro Gly Leu Gln Ala  Lys Ala Thr
    2360                 2365                 2370

Arg Glu  Ala Gln Lys Arg Ala  Ala Ala Gly Ile Met  Lys Asn Pro
    2375                 2380                 2385

Thr Val  Asp Gly Ile Thr Val  Ile Asp Leu Asp Pro  Ile Pro Tyr
    2390                 2395                 2400

Asp Pro  Lys Phe Glu Lys Gln  Leu Gly Gln Val Met  Leu Leu Val
    2405                 2410                 2415

Leu Cys  Val Thr Gln Val Leu  Met Met Arg Thr Thr  Trp Ala Leu
    2420                 2425                 2430
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Cys Glu  Ala Leu Thr Leu Ala  Thr Gly Pro Ile Ser  Thr Leu Trp
    2435                 2440                 2445

Glu Gly  Asn Pro Gly Arg Phe  Trp Asn Thr Thr Ile  Ala Val Ser
    2450                 2455                 2460

Met Ala  Asn Ile Phe Arg Gly  Ser Tyr Leu Ala Gly  Ala Gly Leu
    2465                 2470                 2475

Leu Phe  Ser Ile Met Lys Asn  Thr Thr Asn Thr Arg  Arg Gly Thr
    2480                 2485                 2490

Gly Asn  Ile Gly Glu Thr Leu  Gly Glu Lys Trp Lys  Ser Arg Leu
    2495                 2500                 2505

Asn Ala  Leu Gly Lys Ser Glu  Phe Gln Ile Tyr Lys  Lys Ser Gly
    2510                 2515                 2520

Ile Gln  Glu Val Asp Arg Thr  Leu Ala Lys Glu Gly  Ile Lys Arg
    2525                 2530                 2535

Gly Glu  Thr Asp His His Ala  Val Ser Arg Gly Ser  Ala Lys Leu
    2540                 2545                 2550

Arg Trp  Phe Val Glu Arg Asn  Met Val Thr Pro Glu  Gly Lys Val
    2555                 2560                 2565

Val Asp  Leu Gly Cys Gly Arg  Gly Gly Trp Ser Tyr  Tyr Cys Gly
    2570                 2575                 2580

Gly Leu  Lys Asn Val Arg Glu  Val Lys Gly Leu Thr  Lys Gly Gly
    2585                 2590                 2595

Pro Gly  His Glu Glu Pro Ile  Pro Met Ser Thr Tyr  Gly Trp Asn
    2600                 2605                 2610

Leu Val  Arg Leu Gln Ser Gly  Val Asp Val Phe Phe  Ile Pro Pro
    2615                 2620                 2625

Glu Lys  Cys Asp Thr Leu Leu  Cys Asp Ile Gly Glu  Ser Ser Pro
    2630                 2635                 2640

Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
    2645                 2650                 2655

Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
    2660                 2665                 2670

Leu Asn  Pro Tyr Met Pro Ser  Val Ile Glu Lys Met  Glu Ala Leu
    2675                 2680                 2685
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Gln Arg  Lys Tyr Gly Gly Ala  Leu Val Arg Asn Pro  Leu Ser Arg
    2690                 2695                 2700

Asn Ser  Thr His Glu Met Tyr  Trp Val Ser Asn Ala  Ser Gly Asn
    2705                 2710                 2715

Ile Val  Ser Ser Val Asn Met  Ile Ser Arg Met Leu  Ile Asn Arg
    2720                 2725                 2730

Phe Thr  Met Arg Tyr Lys Lys  Ala Thr Tyr Glu Pro  Asp Val Asp
    2735                 2740                 2745

Leu Gly  Ser Gly Thr Arg Asn  Ile Gly Ile Glu Ser  Glu Ile Pro
    2750                 2755                 2760

Asn Leu  Asp Ile Ile Gly Lys  Arg Ile Glu Lys Ile  Lys Gln Glu
    2765                 2770                 2775

His Glu  Thr Ser Trp His Tyr  Asp Gln Asp His Pro  Tyr Lys Thr
    2780                 2785                 2790

Trp Ala  Tyr His Gly Ser Tyr  Glu Thr Lys Gln Thr  Gly Ser Ala
    2795                 2800                 2805

Ser Ser  Met Val Asn Gly Val  Val Arg Leu Leu Thr  Lys Pro Trp
    2810                 2815                 2820

Asp Val  Val Pro Met Val Thr  Gln Met Ala Met Thr  Asp Thr Thr
    2825                 2830                 2835

Pro Phe  Gly Gln Gln Arg Val  Phe Lys Glu Lys Val  Asp Thr Arg
    2840                 2845                 2850

Thr Gln  Glu Pro Lys Glu Gly  Thr Lys Lys Leu Met  Lys Ile Thr
    2855                 2860                 2865

Ala Glu  Trp Leu Trp Lys Glu  Leu Gly Lys Lys Lys  Thr Pro Arg
    2870                 2875                 2880

Met Cys  Thr Arg Glu Glu Phe  Thr Arg Lys Val Arg  Ser Asn Ala
    2885                 2890                 2895

Ala Leu  Gly Ala Val Phe Thr  Asp Glu Asn Lys Trp  Lys Ser Ala
    2900                 2905                 2910

Arg Glu  Ala Val Glu Asp Ser  Arg Phe Trp Glu Leu  Val Asp Lys
    2915                 2920                 2925

Glu Arg  Asn Leu His Leu Glu  Gly Lys Cys Glu Thr  Cys Val Tyr
    2930                 2935                 2940
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Asn Met  Met Gly Lys Arg Glu  Lys Lys Leu Gly Glu  Phe Gly Lys
    2945                 2950                 2955

Ala Lys  Gly Ser Arg Ala Ile  Trp Tyr Met Trp Leu  Gly Ala Arg
    2960                 2965                 2970

Phe Leu  Glu Phe Glu Ala Leu  Gly Phe Leu Asn Glu  Asp His Trp
    2975                 2980                 2985

Phe Ser  Arg Glu Asn Ser Leu  Ser Gly Val Glu Gly  Glu Gly Leu
    2990                 2995                 3000

His Lys  Leu Gly Tyr Ile Leu  Arg Asp Val Ser Lys  Lys Glu Gly
    3005                 3010                 3015

Gly Ala  Met Tyr Ala Asp Asp  Thr Ala Gly Trp Asp  Thr Arg Ile
    3020                 3025                 3030

Thr Leu  Glu Asp Leu Lys Asn  Glu Glu Met Val Thr  Asn His Met
    3035                 3040                 3045

Glu Gly  Glu His Lys Lys Leu  Ala Glu Ala Ile Phe  Lys Leu Thr
    3050                 3055                 3060

Tyr Gln  Asn Lys Val Val Arg  Val Gln Arg Pro Thr  Pro Arg Gly
    3065                 3070                 3075

Thr Val  Met Asp Ile Ile Ser  Arg Arg Asp Gln Arg  Gly Ser Gly
    3080                 3085                 3090

Gln Val  Gly Thr Tyr Gly Leu  Asn Thr Phe Thr Asn  Met Glu Ala
    3095                 3100                 3105

Gln Leu  Ile Arg Gln Met Glu  Gly Glu Gly Val Phe  Lys Ser Ile
    3110                 3115                 3120

Gln His  Leu Thr Ile Thr Glu  Glu Ile Ala Val Gln  Asn Trp Leu
    3125                 3130                 3135

Ala Arg  Val Gly Arg Glu Arg  Leu Ser Arg Met Ala  Ile Ser Gly
    3140                 3145                 3150

Asp Asp  Cys Val Val Lys Pro  Leu Asp Asp Arg Phe  Ala Ser Ala
    3155                 3160                 3165

Leu Thr  Ala Leu Asn Asp Met  Gly Lys Ile Arg Lys  Asp Ile Gln
    3170                 3175                 3180

Gln Trp  Glu Pro Ser Arg Gly  Trp Asn Asp Trp Thr  Gln Val Pro
    3185                 3190                 3195
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Phe Cys  Ser His His Phe His  Glu Leu Ile Met Lys  Asp Gly Arg
    3200                 3205                 3210

Val Leu  Val Val Pro Cys Arg  Asn Gln Asp Glu Leu  Ile Gly Arg
    3215                 3220                 3225

Ala Arg  Ile Ser Gln Gly Ala  Gly Trp Ser Leu Arg  Glu Thr Ala
    3230                 3235                 3240

Cys Leu  Gly Lys Ser Tyr Ala  Gln Met Trp Ser Leu  Met Tyr Phe
    3245                 3250                 3255

His Arg  Arg Asp Leu Arg Leu  Ala Ala Asn Ala Ile  Cys Ser Ala
    3260                 3265                 3270

Val Pro  Ser His Trp Val Pro  Thr Ser Arg Thr Thr  Trp Ser Ile
    3275                 3280                 3285

His Ala  Lys His Glu Trp Met  Thr Thr Glu Asp Met  Leu Thr Val
    3290                 3295                 3300

Trp Asn  Arg Val Trp Ile Gln  Glu Asn Pro Trp Met  Glu Asp Lys
    3305                 3310                 3315

Thr Pro  Val Glu Ser Trp Glu  Glu Ile Pro Tyr Leu  Gly Lys Arg
    3320                 3325                 3330

Glu Asp  Gln Trp Cys Gly Ser  Leu Ile Gly Leu Thr  Ser Arg Ala
    3335                 3340                 3345

Thr Trp  Ala Lys Asn Ile Gln  Ala Ala Ile Asn Gln  Val Arg Ser
    3350                 3355                 3360

Leu Ile  Gly Asn Glu Glu Tyr  Thr Asp Tyr Met Pro  Ser Met Lys
    3365                 3370                 3375

Arg Phe  Arg Arg Glu Glu Glu  Glu Ala Gly Val Leu  Trp
    3380                 3385                 3390


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Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
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Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
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Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
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Asp Thr Ile Thr Tyr Glu Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
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Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
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Thr Cys Thr Thr Met Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
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Met Ser Ser Glu Gly Ala Trp Lys His Val Gln Arg Ile Glu Thr Trp
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Ile Leu Arg His Pro Gly Phe Thr Met Met Ala Ala Ile Leu Ala Tyr
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Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
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Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
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Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu His Ala Val Gly
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Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Ile Thr Pro Gln Ser
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Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
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Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
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Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
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Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
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Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
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Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
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Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
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Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
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His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
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Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
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Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910
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Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065

Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                1105                1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                1120                1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                1135                1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                1150                1155

Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                1165                1170
```

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Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                1180                1185

Ala Thr  Met Thr Asp Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
    1190                1195                1200

Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
    1205                1210                1215

Leu Leu  Arg Lys Leu Thr Ser  Lys Glu Leu Met Met  Thr Thr Ile
    1220                1225                1230

Gly Ile  Val Leu Leu Ser Gln  Ser Thr Ile Pro Glu  Thr Ile Leu
    1235                1240                1245

Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
    1250                1255                1260

Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
    1265                1270                1275

Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                1285                1290

Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                1300                1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                1315                1320

Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                1330                1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                1345                1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                1360                1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                1375                1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                1390                1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                1405                1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                1420                1425
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Met Ser  Ile Lys Asn Glu Glu  Glu Glu Gln Thr Leu  Thr Ile Leu
    1430                1435                1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                1450                1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                1465                1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                1480                1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                1495                1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                1510                1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                1525                1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                1540                1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                1555                1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                1570                1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                1585                1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                1600                1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                1615                1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                1630                1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                1645                1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                1660                1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                1675                1680
```

```
Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                 1690                 1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
    1700                 1705                 1710

Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
    1715                 1720                 1725

Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
    1730                 1735                 1740

Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                 1750                 1755

Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                 1765                 1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                 1780                 1785

Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
    1790                 1795                 1800

Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
    1805                 1810                 1815

Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
    1820                 1825                 1830

Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
    1835                 1840                 1845

Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
    1850                 1855                 1860

Thr Phe  Asp Ser Glu Tyr Val  Lys Thr Arg Thr Asn  Asp Trp Asp
    1865                 1870                 1875

Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                 1885                 1890

Ala Glu  Arg Val Ile Asp Pro  Arg Arg Cys Met Lys  Pro Val Ile
    1895                 1900                 1905

Leu Thr  Asp Gly Glu Glu Arg  Val Ile Leu Ala Gly  Pro Met Pro
    1910                 1915                 1920

Val Thr  His Ser Ser Ala Ala  Gln Arg Arg Gly Arg  Ile Gly Arg
    1925                 1930                 1935
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Asn Pro  Lys Asn Glu Asn Asp  Gln Tyr Ile Tyr Met  Gly Glu Pro
    1940                1945                1950

Leu Glu  Asn Asp Glu Asp Cys  Ala His Trp Lys Glu  Ala Lys Met
    1955                1960                1965

Leu Leu  Asp Asn Ile Asn Thr  Pro Glu Gly Ile Ile  Pro Ser Met
    1970                1975                1980

Phe Glu  Pro Glu Arg Glu Lys  Val Asp Ala Ile Asp  Gly Glu Tyr
    1985                1990                1995

Arg Leu  Arg Gly Glu Ala Arg  Lys Thr Phe Val Asp  Leu Met Arg
    2000                2005                2010

Arg Gly  Asp Leu Pro Val Trp  Leu Ala Tyr Arg Val  Ala Ala Glu
    2015                2020                2025

Gly Ile  Asn Tyr Ala Asp Arg  Arg Trp Cys Phe Asp  Gly Val Lys
    2030                2035                2040

Asn Asn  Gln Ile Leu Glu Glu  Asn Val Glu Val Glu  Ile Trp Thr
    2045                2050                2055

Lys Glu  Gly Glu Arg Lys Lys  Leu Lys Pro Arg Trp  Leu Asp Ala
    2060                2065                2070

Arg Ile  Tyr Ser Asp Pro Leu  Ala Leu Lys Glu Phe  Lys Glu Phe
    2075                2080                2085

Ala Ala  Gly Arg Lys Ser Leu  Thr Leu Asn Leu Ile  Thr Glu Met
    2090                2095                2100

Gly Arg  Leu Pro Thr Phe Met  Thr Gln Lys Ala Arg  Asp Ala Leu
    2105                2110                2115

Asp Asn  Leu Ala Val Leu His  Thr Ala Glu Xaa Gly  Gly Arg Ala
    2120                2125                2130

Tyr Asn  His Ala Leu Ser Glu  Leu Pro Glu Thr Leu  Glu Thr Leu
    2135                2140                2145

Leu Leu  Leu Thr Leu Leu Ala  Thr Val Thr Gly Gly  Ile Phe Leu
    2150                2155                2160

Phe Leu  Met Ser Ala Arg Gly  Ile Gly Lys Met Thr  Leu Gly Met
    2165                2170                2175

Cys Cys  Ile Ile Thr Ala Ser  Ile Leu Leu Trp Tyr  Ala Gln Ile
    2180                2185                2190
```

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Gln Pro  His Trp Ile Ala Ala  Ser Ile Ile Leu Glu  Phe Phe Leu
    2195                 2200                 2205

Ile Val  Leu Leu Ile Pro Glu  Pro Glu Lys Gln Arg  Thr Pro Gln
    2210                 2215                 2220

Asp Asn  Gln Leu Thr Tyr Val  Val Ile Ala Ile Leu  Thr Val Val
    2225                 2230                 2235

Ala Ala  Thr Met Ala Asn Glu  Met Gly Phe Leu Glu  Lys Thr Lys
    2240                 2245                 2250

Lys Asp  Leu Gly Leu Gly Ser  Ile Ala Thr Gln Gln  Pro Glu Ser
    2255                 2260                 2265

Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                 2275                 2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                 2290                 2295

Ile Glu  Asn Ser Ser Val Asn  Val Ser Leu Thr Ala  Ile Ala Asn
    2300                 2305                 2310

Gln Ala  Thr Val Leu Met Gly  Leu Gly Lys Gly Trp  Pro Leu Ser
    2315                 2320                 2325

Lys Met  Asp Ile Gly Val Pro  Leu Leu Ala Ile Gly  Cys Tyr Ser
    2330                 2335                 2340

Gln Val  Asn Pro Ile Thr Leu  Thr Ala Ala Xaa Phe  Leu Leu Val
    2345                 2350                 2355

Ala His  Tyr Ala Ile Ile Gly  Pro Gly Leu Gln Ala  Lys Ala Thr
    2360                 2365                 2370

Arg Glu  Ala Gln Lys Arg Ala  Ala Ala Gly Ile Met  Lys Asn Pro
    2375                 2380                 2385

Thr Val  Asp Gly Ile Thr Val  Ile Asp Leu Asp Pro  Ile Pro Tyr
    2390                 2395                 2400

Asp Pro  Lys Phe Glu Lys Gln  Leu Gly Gln Val Met  Leu Leu Val
    2405                 2410                 2415

Leu Cys  Val Thr Gln Val Leu  Met Met Arg Thr Thr  Trp Ala Leu
    2420                 2425                 2430

Cys Glu  Ala Leu Thr Leu Ala  Thr Gly Pro Ile Ser  Thr Leu Trp
    2435                 2440                 2445
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Glu Gly  Asn Pro Gly Arg Phe  Trp Asn Thr Thr Ile  Ala Val Ser
    2450                 2455                 2460

Met Ala  Asn Ile Phe Arg Gly  Ser Tyr Leu Ala Gly  Ala Gly Leu
    2465                 2470                 2475

Leu Phe  Ser Ile Met Lys Asn  Thr Thr Asn Thr Arg  Arg Gly Thr
    2480                 2485                 2490

Gly Asn  Ile Gly Glu Thr Leu  Gly Glu Lys Trp Lys  Ser Arg Leu
    2495                 2500                 2505

Asn Ala  Leu Gly Lys Ser Glu  Phe Gln Ile Tyr Lys  Lys Ser Gly
    2510                 2515                 2520

Ile Gln  Glu Val Asp Arg Thr  Leu Ala Lys Glu Gly  Ile Lys Arg
    2525                 2530                 2535

Gly Glu  Thr Asp His His Ala  Val Ser Arg Gly Ser  Ala Lys Leu
    2540                 2545                 2550

Arg Trp  Phe Val Glu Arg Asn  Met Val Thr Pro Glu  Gly Lys Val
    2555                 2560                 2565

Val Asp  Leu Gly Cys Gly Arg  Gly Gly Trp Ser Tyr  Tyr Cys Gly
    2570                 2575                 2580

Gly Leu  Lys Asn Val Arg Glu  Val Lys Gly Leu Thr  Lys Gly Gly
    2585                 2590                 2595

Pro Gly  His Glu Glu Pro Ile  Pro Met Ser Thr Tyr  Gly Trp Asn
    2600                 2605                 2610

Leu Val  Arg Leu Gln Ser Gly  Val Asp Val Phe Phe  Ile Pro Pro
    2615                 2620                 2625

Glu Lys  Cys Asp Thr Leu Leu  Cys Asp Ile Gly Glu  Ser Ser Pro
    2630                 2635                 2640

Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
    2645                 2650                 2655

Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
    2660                 2665                 2670

Leu Asn  Pro Tyr Met Pro Ser  Val Ile Glu Lys Met  Glu Ala Leu
    2675                 2680                 2685

Gln Arg  Lys Tyr Gly Gly Ala  Leu Val Arg Asn Pro  Leu Ser Arg
    2690                 2695                 2700
```

```
Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
    2705                2710                2715

Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
    2720                2725                2730

Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
    2735                2740                2745

Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
    2750                2755                2760

Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
    2765                2770                2775

His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
    2780                2785                2790

Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
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Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp
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Asp Val Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
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Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
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Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
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Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
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Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
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Ala Leu Gly Ala Val Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
    2900                2905                2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
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Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
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Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
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```

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Ala Lys  Gly Ser Arg Ala Ile  Trp Tyr Met Trp Leu  Gly Ala Arg
    2960                 2965                 2970

Phe Leu  Glu Phe Glu Ala Leu  Gly Phe Leu Asn Glu  Asp His Trp
    2975                 2980                 2985

Phe Ser  Arg Glu Asn Ser Leu  Ser Gly Val Glu Gly  Glu Gly Leu
    2990                 2995                 3000

His Lys  Leu Gly Tyr Ile Leu  Arg Asp Val Ser Lys  Lys Glu Gly
    3005                 3010                 3015

Gly Ala  Met Tyr Ala Asp Asp  Thr Ala Gly Trp Asp  Thr Arg Ile
    3020                 3025                 3030

Thr Leu  Glu Asp Leu Lys Asn  Glu Glu Met Val Thr  Asn His Met
    3035                 3040                 3045

Glu Gly  Glu His Lys Lys Leu  Ala Glu Ala Ile Phe  Lys Leu Thr
    3050                 3055                 3060

Tyr Gln  Asn Lys Val Val Arg  Val Gln Arg Pro Thr  Pro Arg Gly
    3065                 3070                 3075

Thr Val  Met Asp Ile Ile Ser  Arg Arg Asp Gln Arg  Gly Ser Gly
    3080                 3085                 3090

Gln Val  Gly Thr Tyr Gly Leu  Asn Thr Phe Thr Asn  Met Glu Ala
    3095                 3100                 3105

Gln Leu  Ile Arg Gln Met Glu  Gly Glu Gly Val Phe  Lys Ser Ile
    3110                 3115                 3120

Gln His  Leu Thr Ile Thr Glu  Glu Ile Ala Val Gln  Asn Trp Leu
    3125                 3130                 3135

Ala Arg  Val Gly Arg Glu Arg  Leu Ser Arg Met Ala  Ile Ser Gly
    3140                 3145                 3150

Asp Asp  Cys Val Val Lys Pro  Leu Asp Asp Arg Phe  Ala Ser Ala
    3155                 3160                 3165

Leu Thr  Ala Leu Asn Asp Met  Gly Lys Ile Arg Lys  Asp Ile Gln
    3170                 3175                 3180

Gln Trp  Glu Pro Ser Arg Gly  Trp Asn Asp Trp Thr  Gln Val Pro
    3185                 3190                 3195

Phe Cys  Ser His His Phe His  Glu Leu Ile Met Lys  Asp Gly Arg
    3200                 3205                 3210
```

Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
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Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
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Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
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His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
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Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
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His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
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Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val
        115                 120                 125

Ser Arg Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Val Gly
    130                 135                 140

Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
145                 150                 155                 160

Asp Thr Ile Thr Tyr Glu Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Thr Thr Met Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205
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Leu Val Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Val Gln Arg Ile Glu Thr Trp
225                 230                 235                 240

Ile Leu Arg His Pro Gly Phe Thr Met Met Ala Ala Ile Leu Ala Tyr
                245                 250                 255

Thr Ile Gly Thr Thr His Phe Gln Arg Ala Leu Ile Phe Ile Leu Leu
            260                 265                 270

Thr Ala Val Thr Pro Ser Met Thr Met Arg Cys Ile Gly Met Ser Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val
    290                 295                 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Ile Lys Thr Glu Ala Lys Gln Pro Ala Thr Leu
                325                 330                 335

Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Glu Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
        355                 360                 365

Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Arg
385                 390                 395                 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu His Ala Val Gly
            420                 425                 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Ile Thr Pro Gln Ser
        435                 440                 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
    450                 455                 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465                 470                 475                 480
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Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
            500                 505                 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
        515                 520                 525

Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
    530                 535                 540

Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545                 550                 555                 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
                565                 570                 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
        595                 600                 605

Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
    610                 615                 620

Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
625                 630                 635                 640

Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Asn Trp Phe
            660                 665                 670

Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
705                 710                 715                 720

Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
                725                 730                 735

Ile Leu Ile Gly Val Ile Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
            740                 745                 750
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Thr Ser Leu Ser Val Thr Leu Val Leu Val Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020
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Gly Pro Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln
1025 1030 1035

Ile Thr Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp
1040 1045 1050

Phe Cys Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
1070 1075 1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
1085 1090 1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
1115 1120 1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
1130 1135 1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
1145 1150 1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
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Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
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Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
1190 1195 1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
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Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
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Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
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Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
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Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
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Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
1280 1285 1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
1295 1300 1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
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Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
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Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
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Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
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Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
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Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
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Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
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Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
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Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
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Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
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Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
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Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
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Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
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Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
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Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
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Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
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Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
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Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                1570                1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                1585                1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                1600                1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                1615                1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
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Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                1645                1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                1660                1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                1675                1680

Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                1690                1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
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Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
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Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
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Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                1750                1755

Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                1765                1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                1780                1785
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Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
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Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
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Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
    1820                1825                1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
    1835                1840                1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
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Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
    1865                1870                1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
    1880                1885                1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
    1895                1900                1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
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Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
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Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
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Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
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Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
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Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
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Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
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Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
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Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
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Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
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Asp Asn Leu Ala Val Leu His Thr Ala Glu Pro Gly Gly Arg Ala
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Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
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Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
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Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
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Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
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Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
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Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
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Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
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Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
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Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
20 25 30

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Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Arg Met Ile Val
        115                 120                 125

Gly Lys Asn Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ala Ser Gly
    130                 135                 140

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro His Ile Thr Glu Val Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Thr Gln Thr Trp
    210                 215                 220

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
225                 230                 235                 240

Ala Leu Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
                245                 250                 255

Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300
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Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
                325                 330                 335

Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Ile Thr Thr Asp Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
        355                 360                 365

Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
385                 390                 395                 400

Cys Leu Glu Ser Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
                405                 410                 415

Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
        435                 440                 445

Ala Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
    450                 455                 460

Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Ser Leu Thr Met Lys
465                 470                 475                 480

Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
                485                 490                 495

Pro Trp Thr Ser Gly Ala Ser Ala Glu Thr Pro Thr Trp Asn Arg Lys
            500                 505                 510

Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
        515                 520                 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
    530                 535                 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
545                 550                 555                 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
                565                 570                 575
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Tyr Ala Met Cys Leu Ser Ser Phe Val Leu Lys Lys Glu Val Ser Glu
            580                 585                 590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
        595                 600                 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
    610                 615                 620

Leu Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
625                 630                 635                 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
                645                 650                 655

Val Ile Gly Ile Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
            660                 665                 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
        675                 680                 685

Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
    690                 695                 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
705                 710                 715                 720

Ala Tyr Thr Ala Leu Phe Gly Gly Val Ser Trp Met Met Lys Ile Gly
                725                 730                 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
            740                 745                 750

Met Ser Phe Ser Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr Leu Gly
        755                 760                 765

Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys Asn Lys
    770                 775                 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val His Thr
785                 790                 795                 800

Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys Leu Ala
                805                 810                 815

Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile Arg Ser
            820                 825                 830

Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro Glu Leu
        835                 840                 845
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Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met Thr Gly
    850                 855                 860

Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg Pro Gln
865                 870                 875                 880

Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Met
                885                 890                 895

Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly Pro Glu
            900                 905                 910

Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu Glu Val
        915                 920                 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
    930                 935                 940

Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser Ala Ala
945                 950                 955                 960

Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
                965                 970                 975

Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe Ile Glu
            980                 985                 990

Val Lys Asn Cys His Trp Pro Lys  Ser His Thr Leu Trp  Ser Asn Gly
        995                 1000                1005

Val Leu  Glu Ser Glu Met Ile  Ile Pro Lys Asn Leu  Ala Gly Pro
    1010                1015                1020

Val Ser  Gln His Asn Tyr Arg  Pro Gly Tyr His Thr  Gln Ile Thr
    1025                1030                1035

Gly Pro  Trp His Leu Gly Lys  Leu Glu Met Asp Phe  Asp Phe Cys
    1040                1045                1050

Asp Gly  Thr Thr Val Val Val  Thr Glu Asp Cys Gly  Asn Arg Gly
    1055                1060                1065

Pro Ser  Leu Arg Thr Thr Thr  Ala Ser Gly Lys Leu  Ile Thr Glu
    1070                1075                1080

Trp Cys  Cys Arg Ser Cys Thr  Leu Pro Pro Leu Arg  Tyr Arg Gly
    1085                1090                1095

Glu Asp  Gly Cys Trp Tyr Gly  Met Glu Ile Arg Pro  Leu Lys Glu
    1100                1105                1110
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Lys Glu  Glu Asn Leu Val Asn  Ser Leu Val Thr Ala  Gly His Gly
    1115                 1120                 1125

Gln Val  Asp Asn Phe Ser Leu  Gly Val Leu Gly Met  Ala Leu Phe
    1130                 1135                 1140

Leu Glu  Glu Met Leu Arg Thr  Arg Val Gly Thr Lys  His Ala Ile
    1145                 1150                 1155

Leu Leu  Val Ala Val Ser Phe  Val Thr Leu Ile Thr  Gly Asn Met
    1160                 1165                 1170

Ser Phe  Arg Asp Leu Gly Arg  Val Met Val Met Val  Gly Ala Thr
    1175                 1180                 1185

Met Thr  Asp Asp Ile Gly Met  Gly Val Thr Tyr Leu  Ala Leu Leu
    1190                 1195                 1200

Ala Ala  Phe Lys Val Arg Pro  Thr Phe Ala Ala Gly  Leu Leu Leu
    1205                 1210                 1215

Arg Lys  Leu Thr Ser Lys Glu  Leu Met Met Thr Thr  Ile Gly Ile
    1220                 1225                 1230

Val Leu  Leu Ser Gln Ser Thr  Ile Pro Glu Thr Ile  Leu Glu Leu
    1235                 1240                 1245

Thr Asp  Ala Leu Ala Leu Gly  Met Met Val Leu Lys  Met Val Arg
    1250                 1255                 1260

Asn Met  Glu Lys Tyr Gln Leu  Ala Val Thr Ile Met  Ala Ile Leu
    1265                 1270                 1275

Cys Val  Pro Asn Ala Val Ile  Leu Gln Asn Ala Trp  Lys Val Ser
    1280                 1285                 1290

Cys Thr  Ile Leu Ala Val Val  Ser Val Ser Pro Leu  Phe Leu Thr
    1295                 1300                 1305

Ser Ser  Gln Gln Lys Thr Asp  Trp Ile Pro Leu Ala  Leu Thr Ile
    1310                 1315                 1320

Lys Gly  Leu Asn Pro Thr Ala  Ile Phe Leu Thr Thr  Leu Ser Arg
    1325                 1330                 1335

Thr Ser  Lys Lys Arg Ser Trp  Pro Leu Asn Glu Ala  Ile Met Ala
    1340                 1345                 1350

Val Gly  Met Val Ser Ile Leu  Ala Ser Ser Leu Leu  Lys Asn Asp
    1355                 1360                 1365
```

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Ile Pro  Met Thr Gly Pro Leu  Val Ala Gly Gly Leu  Leu Thr Val
    1370                1375                1380

Cys Tyr  Val Leu Thr Gly Arg  Ser Ala Asp Leu Glu  Leu Glu Arg
    1385                1390                1395

Ala Ala  Asp Val Lys Trp Glu  Asp Gln Ala Glu Ile  Ser Gly Ser
    1400                1405                1410

Ser Pro  Ile Leu Ser Ile Thr  Ile Ser Glu Asp Gly  Ser Met Ser
    1415                1420                1425

Ile Lys  Asn Glu Glu Glu Glu  Gln Thr Leu Thr Ile  Leu Ile Arg
    1430                1435                1440

Thr Gly  Leu Leu Val Ile Ser  Gly Leu Phe Pro Val  Ser Ile Pro
    1445                1450                1455

Ile Thr  Ala Ala Ala Trp Tyr  Leu Trp Glu Val Lys  Lys Gln Arg
    1460                1465                1470

Ala Gly  Val Leu Trp Asp Val  Pro Ser Pro Pro Pro  Met Gly Lys
    1475                1480                1485

Ala Glu  Leu Glu Asp Gly Ala  Tyr Arg Ile Lys Gln  Lys Gly Ile
    1490                1495                1500

Leu Gly  Tyr Ser Gln Ile Gly  Ala Gly Val Tyr Lys  Glu Gly Thr
    1505                1510                1515

Phe His  Thr Met Trp His Val  Thr Arg Gly Ala Val  Leu Met His
    1520                1525                1530

Lys Gly  Lys Arg Ile Glu Pro  Ser Trp Ala Asp Val  Lys Lys Asp
    1535                1540                1545

Leu Ile  Ser Tyr Gly Gly Gly  Trp Lys Leu Glu Gly  Glu Trp Lys
    1550                1555                1560

Glu Gly  Glu Glu Val Gln Val  Leu Ala Leu Glu Pro  Gly Lys Asn
    1565                1570                1575

Pro Arg  Ala Val Gln Thr Lys  Pro Gly Leu Phe Lys  Thr Asn Ala
    1580                1585                1590

Gly Thr  Ile Gly Ala Val Ser  Leu Asp Phe Ser Pro  Gly Thr Ser
    1595                1600                1605

Gly Ser  Pro Ile Ile Asp Lys  Lys Gly Lys Val Val  Gly Leu Tyr
    1610                1615                1620
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Gly Asn  Gly Val Val Thr Arg  Ser Gly Ala Tyr Val  Ser Ala Ile
    1625                 1630                 1635

Ala Gln  Thr Glu Lys Ser Ile  Glu Asp Asn Pro Glu  Ile Glu Asp
    1640                 1645                 1650

Asp Ile  Phe Arg Lys Arg Arg  Leu Thr Ile Met Asp  Leu His Pro
    1655                 1660                 1665

Gly Ala  Gly Lys Thr Lys Arg  Tyr Leu Pro Ala Ile  Val Arg Glu
    1670                 1675                 1680

Ala Ile  Lys Arg Gly Leu Arg  Thr Leu Ile Leu Ala  Pro Thr Arg
    1685                 1690                 1695

Val Val  Ala Ala Glu Met Glu  Glu Ala Leu Arg Gly  Leu Pro Ile
    1700                 1705                 1710

Arg Tyr  Gln Thr Pro Ala Ile  Arg Ala Val His Thr  Gly Arg Glu
    1715                 1720                 1725

Ile Val  Asp Leu Met Cys His  Ala Thr Phe Thr Met  Arg Leu Leu
    1730                 1735                 1740

Ser Pro  Val Arg Val Pro Asn  Tyr Asn Leu Ile Ile  Met Asp Glu
    1745                 1750                 1755

Ala His  Phe Thr Asp Pro Ala  Ser Ile Ala Ala Arg  Gly Tyr Ile
    1760                 1765                 1770

Ser Thr  Arg Val Glu Met Gly  Glu Ala Ala Gly Ile  Phe Met Thr
    1775                 1780                 1785

Ala Thr  Pro Pro Gly Ser Arg  Asp Pro Phe Pro Gln  Ser Asn Ala
    1790                 1795                 1800

Pro Ile  Ile Asp Glu Glu Arg  Glu Ile Pro Glu Arg  Ser Trp Asn
    1805                 1810                 1815

Ser Gly  His Glu Trp Val Thr  Asp Phe Lys Gly Lys  Thr Val Trp
    1820                 1825                 1830

Phe Val  Pro Ser Ile Lys Ala  Gly Asn Asp Ile Ala  Ala Cys Leu
    1835                 1840                 1845

Arg Lys  Asn Gly Lys Lys Val  Ile Gln Leu Ser Arg  Lys Thr Phe
    1850                 1855                 1860

Asp Ser  Glu Tyr Val Lys Thr  Arg Thr Asn Asp Trp  Asp Phe Val
    1865                 1870                 1875
```

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Val Thr  Thr Asp Ile Ser Glu  Met Gly Ala Asn Phe  Lys Ala Glu
    1880                 1885                 1890

Arg Val  Ile Asp Pro Arg Arg  Cys Met Lys Pro Val  Ile Leu Thr
    1895                 1900                 1905

Asp Gly  Glu Glu Arg Val Ile  Leu Ala Gly Pro Met  Pro Val Thr
    1910                 1915                 1920

His Ser  Ser Ala Ala Gln Arg  Arg Gly Arg Ile Gly  Arg Asn Pro
    1925                 1930                 1935

Lys Asn  Glu Asn Asp Gln Tyr  Ile Tyr Met Gly Glu  Pro Leu Glu
    1940                 1945                 1950

Asn Asp  Glu Asp Cys Ala His  Trp Lys Glu Ala Lys  Met Leu Leu
    1955                 1960                 1965

Asp Asn  Ile Asn Thr Pro Glu  Gly Ile Ile Pro Ser  Met Phe Glu
    1970                 1975                 1980

Pro Glu  Arg Glu Lys Val Asp  Ala Ile Asp Gly Glu  Tyr Arg Leu
    1985                 1990                 1995

Arg Gly  Glu Ala Arg Lys Thr  Phe Val Asp Leu Met  Arg Arg Gly
    2000                 2005                 2010

Asp Leu  Pro Val Trp Leu Ala  Tyr Arg Val Ala Ala  Glu Gly Ile
    2015                 2020                 2025

Asn Tyr  Ala Asp Arg Arg Trp  Cys Phe Asp Gly Val  Lys Asn Asn
    2030                 2035                 2040

Gln Ile  Leu Glu Glu Asn Val  Glu Val Glu Ile Trp  Thr Lys Glu
    2045                 2050                 2055

Gly Glu  Arg Lys Lys Leu Lys  Pro Arg Trp Leu Asp  Ala Arg Ile
    2060                 2065                 2070

Tyr Ser  Asp Pro Leu Ala Leu  Lys Glu Phe Lys Glu  Phe Ala Ala
    2075                 2080                 2085

Gly Arg  Lys Ser Leu Thr Leu  Asn Leu Ile Thr Glu  Met Gly Arg
    2090                 2095                 2100

Leu Pro  Thr Phe Met Thr Gln  Lys Ala Arg Asp Ala  Leu Asp Asn
    2105                 2110                 2115

Leu Ala  Val Leu His Thr Ala  Glu Ala Gly Gly Arg  Ala Tyr Asn
    2120                 2125                 2130
```

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His Ala  Leu Ser Glu Leu Pro  Glu Thr Leu Glu Thr  Leu Leu Leu
    2135                 2140                 2145

Leu Thr  Leu Leu Ala Thr Val  Thr Gly Gly Ile Phe  Leu Phe Leu
    2150                 2155                 2160

Met Ser  Ala Arg Gly Ile Gly  Lys Met Thr Leu Gly  Met Cys Cys
    2165                 2170                 2175

Ile Ile  Thr Ala Ser Ile Leu  Leu Trp Tyr Ala Gln  Ile Gln Pro
    2180                 2185                 2190

His Trp  Ile Ala Ala Ser Ile  Ile Leu Glu Phe Phe  Leu Ile Val
    2195                 2200                 2205

Leu Leu  Ile Pro Glu Pro Glu  Lys Gln Arg Thr Pro  Gln Asp Asn
    2210                 2215                 2220

Gln Leu  Thr Tyr Val Val Ile  Ala Ile Leu Thr Val  Val Ala Ala
    2225                 2230                 2235

Thr Met  Ala Asn Glu Met Gly  Phe Leu Glu Lys Thr  Lys Lys Asp
    2240                 2245                 2250

Leu Gly  Leu Gly Ser Ile Ala  Thr Gln Gln Pro Glu  Ser Asn Ile
    2255                 2260                 2265

Leu Asp  Ile Asp Leu Arg Pro  Ala Ser Ala Trp Thr  Leu Tyr Ala
    2270                 2275                 2280

Val Ala  Thr Thr Phe Val Thr  Pro Met Leu Arg His  Ser Ile Glu
    2285                 2290                 2295

Asn Ser  Ser Val Asn Val Ser  Leu Thr Ala Ile Ala  Asn Gln Ala
    2300                 2305                 2310

Thr Val  Leu Met Gly Leu Gly  Lys Gly Trp Pro Leu  Ser Lys Met
    2315                 2320                 2325

Asp Ile  Gly Val Pro Leu Leu  Ala Ile Gly Cys Tyr  Ser Gln Val
    2330                 2335                 2340

Asn Pro  Ile Thr Leu Thr Ala  Ala Leu Phe Leu Leu  Val Ala His
    2345                 2350                 2355

Tyr Ala  Ile Ile Gly Pro Gly  Leu Gln Ala Lys Ala  Thr Arg Glu
    2360                 2365                 2370

Ala Gln  Lys Arg Ala Ala Ala  Gly Ile Met Lys Asn  Pro Thr Val
    2375                 2380                 2385
```

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Asp Gly  Ile Thr Val Ile Asp  Leu Asp Pro Ile Pro  Tyr Asp Pro
    2390                 2395                 2400

Lys Phe  Glu Lys Gln Leu Gly  Gln Val Met Leu Leu  Val Leu Cys
    2405                 2410                 2415

Val Thr  Gln Val Leu Met Met  Arg Thr Thr Trp Ala  Leu Cys Glu
    2420                 2425                 2430

Ala Leu  Thr Leu Ala Thr Gly  Pro Ile Ser Thr Leu  Trp Glu Gly
    2435                 2440                 2445

Asn Pro  Gly Arg Phe Trp Asn  Thr Thr Ile Ala Val  Ser Met Ala
    2450                 2455                 2460

Asn Ile  Phe Arg Gly Ser Tyr  Leu Ala Gly Ala Gly  Leu Leu Phe
    2465                 2470                 2475

Ser Ile  Met Lys Asn Thr Thr  Asn Thr Arg Arg Gly  Thr Gly Asn
    2480                 2485                 2490

Ile Gly  Glu Thr Leu Gly Glu  Lys Trp Lys Ser Arg  Leu Asn Ala
    2495                 2500                 2505

Leu Gly  Lys Ser Glu Phe Gln  Ile Tyr Lys Lys Ser  Gly Ile Gln
    2510                 2515                 2520

Glu Val  Asp Arg Thr Leu Ala  Lys Glu Gly Ile Lys  Arg Gly Glu
    2525                 2530                 2535

Thr Asp  His His Ala Val Ser  Arg Gly Ser Ala Lys  Leu Arg Trp
    2540                 2545                 2550

Phe Val  Glu Arg Asn Met Val  Thr Pro Glu Gly Lys  Val Val Asp
    2555                 2560                 2565

Leu Gly  Cys Gly Arg Gly Gly  Trp Ser Tyr Tyr Cys  Gly Gly Leu
    2570                 2575                 2580

Lys Asn  Val Arg Glu Val Lys  Gly Leu Thr Lys Gly  Gly Pro Gly
    2585                 2590                 2595

His Glu  Glu Pro Ile Pro Met  Ser Thr Tyr Gly Trp  Asn Leu Val
    2600                 2605                 2610

Arg Leu  Gln Ser Gly Val Asp  Val Phe Phe Ile Pro  Pro Glu Lys
    2615                 2620                 2625

Cys Asp  Thr Leu Leu Cys Asp  Ile Gly Glu Ser Ser  Pro Asn Pro
    2630                 2635                 2640
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Thr Val  Glu Ala Gly Arg Thr  Leu Arg Val Leu Asn  Leu Val Glu
    2645                 2650                 2655

Asn Trp  Leu Asn Asn Asn Thr  Gln Phe Cys Ile Lys  Val Leu Asn
    2660                 2665                 2670

Pro Tyr  Met Pro Ser Val Ile  Glu Lys Met Glu Ala  Leu Gln Arg
    2675                 2680                 2685

Lys Tyr  Gly Gly Ala Leu Val  Arg Asn Pro Leu Ser  Arg Asn Ser
    2690                 2695                 2700

Thr His  Glu Met Tyr Trp Val  Ser Asn Ala Ser Gly  Asn Ile Val
    2705                 2710                 2715

Ser Ser  Val Asn Met Ile Ser  Arg Met Leu Ile Asn  Arg Phe Thr
    2720                 2725                 2730

Met Arg  Tyr Lys Lys Ala Thr  Tyr Glu Pro Asp Val  Asp Leu Gly
    2735                 2740                 2745

Ser Gly  Thr Arg Asn Ile Gly  Ile Glu Ser Glu Ile  Pro Asn Leu
    2750                 2755                 2760

Asp Ile  Ile Gly Lys Arg Ile  Glu Lys Ile Lys Gln  Glu His Glu
    2765                 2770                 2775

Thr Ser  Trp His Tyr Asp Gln  Asp His Pro Tyr Lys  Thr Trp Ala
    2780                 2785                 2790

Tyr His  Gly Ser Tyr Glu Thr  Lys Gln Thr Gly Ser  Ala Ser Ser
    2795                 2800                 2805

Met Val  Asn Gly Val Val Arg  Leu Leu Thr Lys Pro  Trp Asp Val
    2810                 2815                 2820

Val Pro  Met Val Thr Gln Met  Ala Met Thr Asp Thr  Thr Pro Phe
    2825                 2830                 2835

Gly Gln  Gln Arg Val Phe Lys  Glu Lys Val Asp Thr  Arg Thr Gln
    2840                 2845                 2850

Glu Pro  Lys Glu Gly Thr Lys  Lys Leu Met Lys Ile  Thr Ala Glu
    2855                 2860                 2865

Trp Leu  Trp Lys Glu Leu Gly  Lys Lys Lys Thr Pro  Arg Met Cys
    2870                 2875                 2880

Thr Arg  Glu Glu Phe Thr Arg  Lys Val Arg Ser Asn  Ala Ala Leu
    2885                 2890                 2895
```

```
Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala Arg Glu
    2900                2905                2910

Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys Glu Arg
    2915                2920                2925

Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr Asn Met
    2930                2935                2940

Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys Ala Lys
    2945                2950                2955

Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Phe Leu
    2960                2965                2970

Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser
    2975                2980                2985

Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu His Lys
    2990                2995                3000

Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly Gly Ala
    3005                3010                3015

Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Leu
    3020                3025                3030

Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met Glu Gly
    3035                3040                3045

Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr Tyr Gln
    3050                3055                3060

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Ser His  Trp Val Pro Thr Ser  Arg Thr Thr Trp Ser  Ile His Ala
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Lys His  Glu Trp Met Thr Thr  Glu Asp Met Leu Thr  Val Trp Asn
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Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
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Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
565 570 575

Tyr Ala Met Cys Leu Ser Ser Phe Val Leu Lys Lys Glu Val Ser Glu
580 585 590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
595 600 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
610 615 620

Leu Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
625 630 635 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
645 650 655

Val Ile Gly Ile Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
660 665 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
675 680 685

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Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
    690                 695                 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
705                 710                 715                 720

Ala Tyr Thr Ala Leu Phe Gly Gly Val Ser Trp Met Met Lys Ile Gly
                725                 730                 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
            740                 745                 750

Met Ser Phe Ser Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr Leu Gly
        755                 760                 765

Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys Asn Lys
    770                 775                 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val His Thr
785                 790                 795                 800

Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys Leu Ala
                805                 810                 815

Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile Arg Ser
            820                 825                 830

Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro Glu Leu
        835                 840                 845

Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met Thr Gly
    850                 855                 860

Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg Pro Gln
865                 870                 875                 880

Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Met
                885                 890                 895

Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly Pro Glu
            900                 905                 910

Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu Glu Val
        915                 920                 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
    930                 935                 940

Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser Ala Ala
945                 950                 955                 960
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Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
                965                 970                 975

Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe Ile Glu
            980                 985                 990

Val Lys Asn Cys His Trp Pro Lys Ser His Thr Leu Trp Ser Asn Gly
        995                 1000                1005

Val Leu Glu Ser Glu Met Ile Ile Pro Lys Asn Leu Ala Gly Pro
    1010                1015                1020

Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln Ile Thr
    1025                1030                1035

Gly Pro Trp His Leu Gly Lys Leu Glu Met Asp Phe Asp Phe Cys
    1040                1045                1050

Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn Arg Gly
    1055                1060                1065

Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile Thr Glu
    1070                1075                1080

Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr Arg Gly
    1085                1090                1095

Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu Lys Glu
    1100                1105                1110

Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly His Gly
    1115                1120                1125

Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala Leu Phe
    1130                1135                1140

Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His Ala Ile
    1145                1150                1155

Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly Asn Met
    1160                1165                1170

Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly Ala Thr
    1175                1180                1185

Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala Leu Leu
    1190                1195                1200

Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu Leu Leu
    1205                1210                1215
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Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile Gly Ile
1220 1225 1230

Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu Glu Leu
1235 1240 1245

Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met Val Arg
1250 1255 1260

Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala Ile Leu
1265 1270 1275

Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys Val Ser
1280 1285 1290

Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe Leu Thr
1295 1300 1305

Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu Thr Ile
1310 1315 1320

Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu Ser Arg
1325 1330 1335

Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile Met Ala
1340 1345 1350

Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys Asn Asp
1355 1360 1365

Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu Thr Val
1370 1375 1380

Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu Glu Arg
1385 1390 1395

Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser Gly Ser
1400 1405 1410

Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser Met Ser
1415 1420 1425

Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu Ile Arg
1430 1435 1440

Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser Ile Pro
1445 1450 1455

Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys Gln Arg
1460 1465 1470

Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met Gly Lys
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Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys Gly Ile
1490 1495 1500

Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu Gly Thr
1505 1510 1515

Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu Met His
1520 1525 1530

Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys Lys Asp
1535 1540 1545

Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu Trp Lys
1550 1555 1560

Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly Lys Asn
1565 1570 1575

Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Asn Ala
1580 1585 1590

Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly Thr Ser
1595 1600 1605

Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly Leu Tyr
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Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser Ala Ile
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Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile Glu Asp
1640 1645 1650

Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu His Pro
1655 1660 1665

Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val Arg Glu
1670 1675 1680

Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro Thr Arg
1685 1690 1695

Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro Ile
1700 1705 1710

Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly Arg Glu
1715 1720 1725

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Ile Val  Asp Leu Met Cys His  Ala Thr Phe Thr Met  Arg Leu Leu
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Ser Pro  Val Arg Val Pro Asn  Tyr Asn Leu Ile Ile  Met Asp Glu
    1745                 1750                 1755

Ala His  Phe Thr Asp Pro Ala  Ser Ile Ala Ala Arg  Gly Tyr Ile
    1760                 1765                 1770

Ser Thr  Arg Val Glu Met Gly  Glu Ala Ala Gly Ile  Phe Met Thr
    1775                 1780                 1785

Ala Thr  Pro Pro Gly Ser Arg  Asp Pro Phe Pro Gln  Ser Asn Ala
    1790                 1795                 1800

Pro Ile  Ile Asp Glu Glu Arg  Glu Ile Pro Glu Arg  Ser Trp Asn
    1805                 1810                 1815

Ser Gly  His Glu Trp Val Thr  Asp Phe Lys Gly Lys  Thr Val Trp
    1820                 1825                 1830

Phe Val  Pro Ser Ile Lys Ala  Gly Asn Asp Ile Ala  Ala Cys Leu
    1835                 1840                 1845

Arg Lys  Asn Gly Lys Lys Val  Ile Gln Leu Ser Arg  Lys Thr Phe
    1850                 1855                 1860

Asp Ser  Glu Tyr Val Lys Thr  Arg Thr Asn Asp Trp  Asp Phe Val
    1865                 1870                 1875

Val Thr  Thr Asp Ile Ser Glu  Met Gly Ala Asn Phe  Lys Ala Glu
    1880                 1885                 1890

Arg Val  Ile Asp Pro Arg Arg  Cys Met Lys Pro Val  Ile Leu Thr
    1895                 1900                 1905

Asp Gly  Glu Glu Arg Val Ile  Leu Ala Gly Pro Met  Pro Val Thr
    1910                 1915                 1920

His Ser  Ser Ala Ala Gln Arg  Arg Gly Arg Ile Gly  Arg Asn Pro
    1925                 1930                 1935

Lys Asn  Glu Asn Asp Gln Tyr  Ile Tyr Met Gly Glu  Pro Leu Glu
    1940                 1945                 1950

Asn Asp  Glu Asp Cys Ala His  Trp Lys Glu Ala Lys  Met Leu Leu
    1955                 1960                 1965

Asp Asn  Ile Asn Thr Pro Glu  Gly Ile Ile Pro Ser  Met Phe Glu
    1970                 1975                 1980
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Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr Arg Leu
1985 1990 1995

Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg Arg Gly
2000 2005 2010

Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu Gly Ile
2015 2020 2025

Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys Asn Asn
2030 2035 2040

Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr Lys Glu
2045 2050 2055

Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala Arg Ile
2060 2065 2070

Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe Ala Ala
2075 2080 2085

Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met Gly Arg
2090 2095 2100

Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asp Ala Leu Asp Asn
2105 2110 2115

Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala Tyr Asn
2120 2125 2130

His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu Leu Leu
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Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu Phe Leu
2150 2155 2160

Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met Cys Cys
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Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile Gln Pro
2180 2185 2190

His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu Ile Val
2195 2200 2205

Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln Asp Asn
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Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val Ala Ala
2225 2230 2235

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Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys Lys Asp
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Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser Asn Ile
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Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu Tyr Ala
2270                2275                2280

Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser Ile Glu
2285                2290                2295

Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn Gln Ala
2300                2305                2310

Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser Lys Met
2315                2320                2325

Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser Gln Val
2330                2335                2340

Asn Pro Ile Thr Leu Thr Ala Ala Leu Phe Leu Leu Val Ala His
2345                2350                2355

Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr Arg Glu
2360                2365                2370

Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro Thr Val
2375                2380                2385

Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr Asp Pro
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Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val Leu Cys
2405                2410                2415

Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu Cys Glu
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Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp Glu Gly
2435                2440                2445

Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser Met Ala
2450                2455                2460

Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Leu Phe
2465                2470                2475

Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr Gly Asn
2480                2485                2490
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Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu Asn Ala
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Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly Ile Gln
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Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg Gly Glu
2525                2530                2535

Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu Arg Trp
2540                2545                2550

Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val Val Asp
2555                2560                2565

Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly Gly Leu
2570                2575                2580

Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly Pro Gly
2585                2590                2595

His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn Leu Val
2600                2605                2610

Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro Glu Lys
2615                2620                2625

Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro Asn Pro
2630                2635                2640

Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu Val Glu
2645                2650                2655

Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val Leu Asn
2660                2665                2670

Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu Gln Arg
2675                2680                2685

Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg Asn Ser
2690                2695                2700

Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn Ile Val
2705                2710                2715

Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg Phe Thr
2720                2725                2730

Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp Leu Gly
2735                2740                2745
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Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro Asn Leu
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Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu His Glu
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Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr Trp Ala
2780 2785 2790

Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala Ser Ser
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Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp Asp Val
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Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr Pro Phe
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Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Gln
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Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr Ala Glu
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Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg Met Cys
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Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala Ala Leu
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Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala Arg Glu
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Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys Glu Arg
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Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr Asn Met
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Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys Ala Lys
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Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Phe Leu
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Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser
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Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu His Lys
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Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly Gly Ala
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Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Leu
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Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met Glu Gly
3035 3040 3045

Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr Tyr Gln
3050 3055 3060

Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly Thr Val
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Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly Gln Val
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Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala Gln Leu
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Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile Gln His
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Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu Ala Arg
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Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly Asp Asp
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Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala Leu Thr
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Ala Leu Asn Asp Met Gly Lys Ile Arg Lys Asp Ile Gln Gln Trp
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Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro Phe Cys
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Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg Val Leu
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Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg Ala Arg
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Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala Cys Leu
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Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe His Arg
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Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala Val Pro
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Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile His Ala
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Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg Glu Asp
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Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala Thr Trp
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Ala Lys Asn Ile Gln Ala Ala Ile Asn Gln Val Arg Ser Leu Ile
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Arg Met Ile Val
        115                 120                 125

Gly Lys Asn Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ala Ser Gly
    130                 135                 140

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro His Ile Thr Glu Val Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
            180                 185                 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
        195                 200                 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Thr Gln Thr Trp
    210                 215                 220

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
225                 230                 235                 240
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Ala Leu Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
                245                 250                 255

Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
            260                 265                 270

Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
    290                 295                 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305                 310                 315                 320

Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
                325                 330                 335

Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Ile Thr Thr Asp Ser
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
        355                 360                 365

Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
385                 390                 395                 400

Cys Leu Glu Ser Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
                405                 410                 415

Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
        435                 440                 445

Ala Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
    450                 455                 460

Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Ser Leu Thr Met Lys
465                 470                 475                 480

Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
                485                 490                 495

Pro Trp Thr Ser Gly Ala Ser Ala Glu Thr Pro Thr Trp Asn Arg Lys
            500                 505                 510
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Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
        515                 520                 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
    530                 535                 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
545                 550                 555                 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
                565                 570                 575

Tyr Ala Met Cys Leu Ser Ser Phe Val Leu Lys Lys Glu Val Ser Glu
            580                 585                 590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
        595                 600                 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
    610                 615                 620

Leu Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
625                 630                 635                 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
                645                 650                 655

Val Ile Gly Ile Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
            660                 665                 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
        675                 680                 685

Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
    690                 695                 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
705                 710                 715                 720

Ala Tyr Thr Ala Leu Phe Gly Gly Val Ser Trp Met Met Lys Ile Gly
                725                 730                 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
            740                 745                 750

Met Ser Phe Ser Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr Leu Gly
        755                 760                 765

Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys Asn Lys
    770                 775                 780
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Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val His Thr
785                 790                 795                 800

Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys Leu Ala
                805                 810                 815

Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile Arg Ser
            820                 825                 830

Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro Glu Leu
        835                 840                 845

Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met Thr Gly
    850                 855                 860

Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg Pro Gln
865                 870                 875                 880

Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Met
                885                 890                 895

Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly Pro Glu
            900                 905                 910

Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu Glu Val
        915                 920                 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
    930                 935                 940

Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser Ala Ala
945                 950                 955                 960

Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
                965                 970                 975

Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe Ile Glu
            980                 985                 990

Val Lys Asn Cys His Trp Pro Lys  Ser His Thr Leu Trp  Ser Asn Gly
        995                 1000                1005

Val Leu  Glu Ser Glu Met Ile  Ile Pro Lys Asn Leu  Ala Gly Pro
    1010                1015                1020

Val Ser  Gln His Asn Tyr Arg  Pro Gly Tyr His Thr  Gln Ile Thr
    1025                1030                1035

Gly Pro  Trp His Leu Gly Lys  Leu Glu Met Asp Phe  Asp Phe Cys
    1040                1045                1050
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Asp Gly  Thr Thr Val Val Val  Thr Glu Asp Cys Gly  Asn Arg Gly
    1055                 1060                 1065

Pro Ser  Leu Arg Thr Thr Thr  Ala Ser Gly Lys Leu  Ile Thr Glu
    1070                 1075                 1080

Trp Cys  Cys Arg Ser Cys Thr  Leu Pro Pro Leu Arg  Tyr Arg Gly
    1085                 1090                 1095

Glu Asp  Gly Cys Trp Tyr Gly  Met Glu Ile Arg Pro  Leu Lys Glu
    1100                 1105                 1110

Lys Glu  Glu Asn Leu Val Asn  Ser Leu Val Thr Ala  Gly His Gly
    1115                 1120                 1125

Gln Val  Asp Asn Phe Ser Leu  Gly Val Leu Gly Met  Ala Leu Phe
    1130                 1135                 1140

Leu Glu  Glu Met Leu Arg Thr  Arg Val Gly Thr Lys  His Ala Ile
    1145                 1150                 1155

Leu Leu  Val Ala Val Ser Phe  Val Thr Leu Ile Thr  Gly Asn Met
    1160                 1165                 1170

Ser Phe  Arg Asp Leu Gly Arg  Val Met Val Met Val  Gly Ala Thr
    1175                 1180                 1185

Met Thr  Asp Asp Ile Gly Met  Gly Val Thr Tyr Leu  Ala Leu Leu
    1190                 1195                 1200

Ala Ala  Phe Lys Val Arg Pro  Thr Phe Ala Ala Gly  Leu Leu Leu
    1205                 1210                 1215

Arg Lys  Leu Thr Ser Lys Glu  Leu Met Met Thr Thr  Ile Gly Ile
    1220                 1225                 1230

Val Leu  Leu Ser Gln Ser Thr  Ile Pro Glu Thr Ile  Leu Glu Leu
    1235                 1240                 1245

Thr Asp  Ala Leu Ala Leu Gly  Met Met Val Leu Lys  Met Val Arg
    1250                 1255                 1260

Asn Met  Glu Lys Tyr Gln Leu  Ala Val Thr Ile Met  Ala Ile Leu
    1265                 1270                 1275

Cys Val  Pro Asn Ala Val Ile  Leu Gln Asn Ala Trp  Lys Val Ser
    1280                 1285                 1290

Cys Thr  Ile Leu Ala Val Val  Ser Val Ser Pro Leu  Phe Leu Thr
    1295                 1300                 1305
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Ser Ser  Gln Gln Lys Thr Asp  Trp Ile Pro Leu Ala  Leu Thr Ile
    1310                 1315                 1320

Lys Gly  Leu Asn Pro Thr Ala  Ile Phe Leu Thr Thr  Leu Ser Arg
    1325                 1330                 1335

Thr Ser  Lys Lys Arg Ser Trp  Pro Leu Asn Glu Ala  Ile Met Ala
    1340                 1345                 1350

Val Gly  Met Val Ser Ile Leu  Ala Ser Ser Leu Leu  Lys Asn Asp
    1355                 1360                 1365

Ile Pro  Met Thr Gly Pro Leu  Val Ala Gly Gly Leu  Leu Thr Val
    1370                 1375                 1380

Cys Tyr  Val Leu Thr Gly Arg  Ser Ala Asp Leu Glu  Leu Glu Arg
    1385                 1390                 1395

Ala Ala  Asp Val Lys Trp Glu  Asp Gln Ala Glu Ile  Ser Gly Ser
    1400                 1405                 1410

Ser Pro  Ile Leu Ser Ile Thr  Ile Ser Glu Asp Gly  Ser Met Ser
    1415                 1420                 1425

Ile Lys  Asn Glu Glu Glu Glu  Gln Thr Leu Thr Ile  Leu Ile Arg
    1430                 1435                 1440

Thr Gly  Leu Leu Val Ile Ser  Gly Leu Phe Pro Val  Ser Ile Pro
    1445                 1450                 1455

Ile Thr  Ala Ala Ala Trp Tyr  Leu Trp Glu Val Lys  Lys Gln Arg
    1460                 1465                 1470

Ala Gly  Val Leu Trp Asp Val  Pro Ser Pro Pro Pro  Met Gly Lys
    1475                 1480                 1485

Ala Glu  Leu Glu Asp Gly Ala  Tyr Arg Ile Lys Gln  Lys Gly Ile
    1490                 1495                 1500

Leu Gly  Tyr Ser Gln Ile Gly  Ala Gly Val Tyr Lys  Glu Gly Thr
    1505                 1510                 1515

Phe His  Thr Met Trp His Val  Thr Arg Gly Ala Val  Leu Met His
    1520                 1525                 1530

Lys Gly  Lys Arg Ile Glu Pro  Ser Trp Ala Asp Val  Lys Lys Asp
    1535                 1540                 1545

Leu Ile  Ser Tyr Gly Gly Gly  Trp Lys Leu Glu Gly  Glu Trp Lys
    1550                 1555                 1560
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Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly Lys Asn
1565                1570                1575

Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Asn Ala
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Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly Thr Ser
1595                1600                1605

Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly Leu Tyr
1610                1615                1620

Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser Ala Ile
1625                1630                1635

Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile Glu Asp
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Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu His Pro
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Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val Arg Glu
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Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro Thr Arg
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Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro Ile
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Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly Arg Glu
1715                1720                1725

Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg Leu Leu
1730                1735                1740

Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met Asp Glu
1745                1750                1755

Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly Tyr Ile
1760                1765                1770

Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe Met Thr
1775                1780                1785

Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser Asn Ala
1790                1795                1800

Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser Trp Asn
1805                1810                1815
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Ser Gly  His Glu Trp Val Thr  Asp Phe Lys Gly Lys  Thr Val Trp
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Phe Val  Pro Ser Ile Lys Ala  Gly Asn Asp Ile Ala  Ala Cys Leu
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Arg Lys  Asn Gly Lys Lys Val  Ile Gln Leu Ser Arg  Lys Thr Phe
    1850                 1855                 1860

Asp Ser  Glu Tyr Val Lys Thr  Arg Thr Asn Asp Trp  Asp Phe Val
    1865                 1870                 1875

Val Thr  Thr Asp Ile Ser Glu  Met Gly Ala Asn Phe  Lys Ala Glu
    1880                 1885                 1890

Arg Val  Ile Asp Pro Arg Arg  Cys Met Lys Pro Val  Ile Leu Thr
    1895                 1900                 1905

Asp Gly  Glu Glu Arg Val Ile  Leu Ala Gly Pro Met  Pro Val Thr
    1910                 1915                 1920

His Ser  Ser Ala Ala Gln Arg  Arg Gly Arg Ile Gly  Arg Asn Pro
    1925                 1930                 1935

Lys Asn  Glu Asn Asp Gln Tyr  Ile Tyr Met Gly Glu  Pro Leu Glu
    1940                 1945                 1950

Asn Asp  Glu Asp Cys Ala His  Trp Lys Glu Ala Lys  Met Leu Leu
    1955                 1960                 1965

Asp Asn  Ile Asn Thr Pro Glu  Gly Ile Ile Pro Ser  Met Phe Glu
    1970                 1975                 1980

Pro Glu  Arg Glu Lys Val Asp  Ala Ile Asp Gly Glu  Tyr Arg Leu
    1985                 1990                 1995

Arg Gly  Glu Ala Arg Lys Thr  Phe Val Asp Leu Met  Arg Arg Gly
    2000                 2005                 2010

Asp Leu  Pro Val Trp Leu Ala  Tyr Arg Val Ala Ala  Glu Gly Ile
    2015                 2020                 2025

Asn Tyr  Ala Asp Arg Arg Trp  Cys Phe Asp Gly Val  Lys Asn Asn
    2030                 2035                 2040

Gln Ile  Leu Glu Glu Asn Val  Glu Val Glu Ile Trp  Thr Lys Glu
    2045                 2050                 2055

Gly Glu  Arg Lys Lys Leu Lys  Pro Arg Trp Leu Asp  Ala Arg Ile
    2060                 2065                 2070
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Tyr Ser  Asp Pro Leu Ala Leu  Lys Glu Phe Lys Glu  Phe Ala Ala
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Gly Arg  Lys Ser Leu Thr Leu  Asn Leu Ile Thr Glu  Met Gly Arg
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Leu Pro  Thr Phe Met Thr Gln  Lys Ala Arg Asn Ala  Leu Asp Asn
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Leu Ala  Val Leu His Thr Ala  Glu Ala Gly Gly Arg  Ala Tyr Asn
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His Ala  Leu Ser Glu Leu Pro  Glu Thr Leu Glu Thr  Leu Leu Leu
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Leu Thr  Leu Leu Ala Thr Val  Thr Gly Gly Ile Phe  Leu Phe Leu
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Met Ser  Ala Arg Gly Ile Gly  Lys Met Thr Leu Gly  Met Cys Cys
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Ile Ile  Thr Ala Ser Ile Leu  Leu Trp Tyr Ala Gln  Ile Gln Pro
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His Trp  Ile Ala Ala Ser Ile  Ile Leu Glu Phe Phe  Leu Ile Val
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Leu Leu  Ile Pro Glu Pro Glu  Lys Gln Arg Thr Pro  Gln Asp Asn
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Gln Leu  Thr Tyr Val Val Ile  Ala Ile Leu Thr Val  Val Ala Ala
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Thr Met  Ala Asn Glu Met Gly  Phe Leu Glu Lys Thr  Lys Lys Asp
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Leu Gly  Leu Gly Ser Ile Ala  Thr Gln Gln Pro Glu  Ser Asn Ile
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Leu Asp  Ile Asp Leu Arg Pro  Ala Ser Ala Trp Thr  Leu Tyr Ala
    2270                 2275                 2280

Val Ala  Thr Thr Phe Val Thr  Pro Met Leu Arg His  Ser Ile Glu
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Asn Ser  Ser Val Asn Val Ser  Leu Thr Ala Ile Ala  Asn Gln Ala
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Thr Val  Leu Met Gly Leu Gly  Lys Gly Trp Pro Leu  Ser Lys Met
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Tyr Ala  Ile Ile Gly Pro Gly  Leu Gln Ala Lys Ala  Thr Arg Glu
    2360                 2365                 2370

Ala Gln  Lys Arg Ala Ala Ala  Gly Ile Met Lys Asn  Pro Thr Val
    2375                 2380                 2385

Asp Gly  Ile Thr Val Ile Asp  Leu Asp Pro Ile Pro  Tyr Asp Pro
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Lys Phe  Glu Lys Gln Leu Gly  Gln Val Met Leu Leu  Val Leu Cys
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Val Thr  Gln Val Leu Met Met  Arg Thr Thr Trp Ala  Leu Cys Glu
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Ala Leu  Thr Leu Ala Thr Gly  Pro Ile Ser Thr Leu  Trp Glu Gly
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Asn Pro  Gly Arg Phe Trp Asn  Thr Thr Ile Ala Val  Ser Met Ala
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Asn Ile  Phe Arg Gly Ser Tyr  Leu Ala Gly Ala Gly  Leu Leu Phe
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Ser Ile  Met Lys Asn Thr Thr  Asn Thr Arg Arg Gly  Thr Gly Asn
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Ile Gly  Glu Thr Leu Gly Glu  Lys Trp Lys Ser Arg  Leu Asn Ala
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Leu Gly  Lys Ser Glu Phe Gln  Ile Tyr Lys Lys Ser  Gly Ile Gln
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Glu Val  Asp Arg Thr Leu Ala  Lys Glu Gly Ile Lys  Arg Gly Glu
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Thr Asp  His His Ala Val Ser  Arg Gly Ser Ala Lys  Leu Arg Trp
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Phe Val  Glu Arg Asn Met Val  Thr Pro Glu Gly Lys  Val Val Asp
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Leu Gly  Cys Gly Arg Gly Gly  Trp Ser Tyr Tyr Cys  Gly Gly Leu
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Lys Asn  Val Arg Glu Val Lys  Gly Leu Thr Lys Gly  Gly Pro Gly
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His Glu  Glu Pro Ile Pro Met  Ser Thr Tyr Gly Trp  Asn Leu Val
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Arg Leu  Gln Ser Gly Val Asp  Val Phe Phe Ile Pro  Pro Glu Lys
    2615                 2620                 2625

Cys Asp  Thr Leu Leu Cys Asp  Ile Gly Glu Ser Ser  Pro Asn Pro
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Thr Val  Glu Ala Gly Arg Thr  Leu Arg Val Leu Asn  Leu Val Glu
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Asn Trp  Leu Asn Asn Asn Thr  Gln Phe Cys Ile Lys  Val Leu Asn
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Pro Tyr  Met Pro Ser Val Ile  Glu Lys Met Glu Ala  Leu Gln Arg
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Lys Tyr  Gly Gly Ala Leu Val  Arg Asn Pro Leu Ser  Arg Asn Ser
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Thr His  Glu Met Tyr Trp Val  Ser Asn Ala Ser Gly  Asn Ile Val
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Ser Ser  Val Asn Met Ile Ser  Arg Met Leu Ile Asn  Arg Phe Thr
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Met Arg  Tyr Lys Lys Ala Thr  Tyr Glu Pro Asp Val  Asp Leu Gly
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Ser Gly  Thr Arg Asn Ile Gly  Ile Glu Ser Glu Ile  Pro Asn Leu
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Thr Arg  Glu Glu Phe Thr Arg  Lys Val Arg Ser Asn  Ala Ala Leu
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Gly Ala  Ile Phe Thr Asp Glu  Asn Lys Trp Lys Ser  Ala Arg Glu
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Ala Val  Glu Asp Ser Arg Phe  Trp Glu Leu Val Asp  Lys Glu Arg
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Asn Leu  His Leu Glu Gly Lys  Cys Glu Thr Cys Val  Tyr Asn Met
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Met Gly  Lys Arg Glu Lys Lys  Leu Gly Glu Phe Gly  Lys Ala Lys
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Gly Ser  Arg Ala Ile Trp Tyr  Met Trp Leu Gly Ala  Arg Phe Leu
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Glu Phe  Glu Ala Leu Gly Phe  Leu Asn Glu Asp His  Trp Phe Ser
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Arg Glu  Asn Ser Leu Ser Gly  Val Glu Gly Glu Gly  Leu His Lys
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Leu Gly  Tyr Ile Leu Arg Asp  Val Ser Lys Lys Glu  Gly Gly Ala
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Met Tyr  Ala Asp Asp Thr Ala  Gly Trp Asp Thr Arg  Ile Thr Leu
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Glu Asp  Leu Lys Asn Glu Glu  Met Val Thr Asn His  Met Glu Gly
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Glu His  Lys Lys Leu Ala Glu  Ala Ile Phe Lys Leu  Thr Tyr Gln
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Asn Lys  Val Val Arg Val Gln  Arg Pro Thr Pro Arg  Gly Thr Val
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Met Asp  Ile Ile Ser Arg Arg  Asp Gln Arg Gly Ser  Gly Gln Val
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Val Gly  Arg Glu Arg Leu Ser  Arg Met Ala Ile Ser  Gly Asp Asp
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Cys Val  Val Lys Pro Leu Asp  Asp Arg Phe Ala Ser  Ala Leu Thr
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Ala Leu  Asn Asp Met Gly Lys  Ile Arg Lys Asp Ile  Gln Gln Trp
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Ser His  His Phe His Glu Leu  Ile Met Lys Asp Gly  Arg Val Leu
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Val Val  Pro Cys Arg Asn Gln  Asp Glu Leu Ile Gly  Arg Ala Arg
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Ile Ser  Gln Gly Ala Gly Trp  Ser Leu Arg Glu Thr  Ala Cys Leu
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Gly Lys  Ser Tyr Ala Gln Met  Trp Ser Leu Met Tyr  Phe His Arg
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Arg Asp  Leu Arg Leu Ala Ala  Asn Ala Ile Cys Ser  Ala Val Pro
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Ser His  Trp Val Pro Thr Ser  Arg Thr Thr Trp Ser  Ile His Ala
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Lys His  Glu Trp Met Thr Thr  Glu Asp Met Leu Thr  Val Trp Asn
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Val Glu  Ser Trp Glu Glu Ile  Pro Tyr Leu Gly Lys  Arg Glu Asp
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Gln Trp  Cys Gly Ser Leu Ile  Gly Leu Thr Ser Arg  Ala Thr Trp
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
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Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
85 90 95

Arg Arg Arg Arg Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
100 105 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Arg Met Ile Val
115 120 125

Gly Lys Asn Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ala Ser Gly
130 135 140

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
145 150 155 160

Asp Thr Val Thr Tyr Lys Cys Pro His Ile Thr Glu Val Glu Pro Glu
165 170 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
180 185 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
195 200 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Thr Gln Thr Trp
210 215 220

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
225 230 235 240

Ala Leu Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
245 250 255

Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
260 265 270

Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
275 280 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
290 295 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
305 310 315 320

Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
325 330 335

Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Ile Thr Thr Asp Ser
340 345 350

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Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
        355                 360                 365

Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
385                 390                 395                 400

Cys Leu Glu Ser Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
                405                 410                 415

Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
            420                 425                 430

Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
        435                 440                 445

Ala Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
    450                 455                 460

Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Ser Leu Thr Met Lys
465                 470                 475                 480

Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
                485                 490                 495

Pro Trp Thr Ser Gly Ala Ser Ala Glu Thr Pro Thr Trp Asn Arg Lys
            500                 505                 510

Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
        515                 520                 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
    530                 535                 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
545                 550                 555                 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
                565                 570                 575

Tyr Ala Met Cys Leu Ser Ser Phe Val Leu Lys Lys Glu Val Ser Glu
            580                 585                 590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
        595                 600                 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
    610                 615                 620
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Leu Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
625                 630                 635                 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
                645                 650                 655

Val Ile Gly Ile Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
            660                 665                 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
        675                 680                 685

Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
    690                 695                 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
705                 710                 715                 720

Ala Tyr Thr Ala Leu Phe Gly Gly Val Ser Trp Met Met Lys Ile Gly
                725                 730                 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
            740                 745                 750

Met Ser Phe Ser Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr Leu Gly
        755                 760                 765

Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys Asn Lys
    770                 775                 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val His Thr
785                 790                 795                 800

Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys Leu Ala
                805                 810                 815

Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile Arg Ser
            820                 825                 830

Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro Glu Leu
        835                 840                 845

Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met Thr Gly
    850                 855                 860

Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg Pro Gln
865                 870                 875                 880

Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Met
                885                 890                 895
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Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly Pro Glu
            900                 905                 910

Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu Glu Val
        915                 920                 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
    930                 935                 940

Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser Ala Ala
945                 950                 955                 960

Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
                965                 970                 975

Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe Ile Glu
            980                 985                 990

Val Lys Asn Cys His Trp Pro Lys  Ser His Thr Leu Trp  Ser Asn Gly
        995                 1000                1005

Val Leu  Glu Ser Glu Met Ile  Ile Pro Lys Asn Leu  Ala Gly Pro
    1010                1015                1020

Val Ser  Gln His Asn Tyr Arg  Pro Gly Tyr His Thr  Gln Ile Thr
    1025                1030                1035

Gly Pro  Trp His Leu Gly Lys  Leu Glu Met Asp Phe  Asp Phe Cys
    1040                1045                1050

Asp Gly  Thr Thr Val Val Val  Thr Glu Asp Cys Gly  Asn Arg Gly
    1055                1060                1065

Pro Ser  Leu Arg Thr Thr Thr  Ala Ser Gly Lys Leu  Ile Thr Glu
    1070                1075                1080

Trp Cys  Cys Arg Ser Cys Thr  Leu Pro Pro Leu Arg  Tyr Arg Gly
    1085                1090                1095

Glu Asp  Gly Cys Trp Tyr Gly  Met Glu Ile Arg Pro  Leu Lys Glu
    1100                1105                1110

Lys Glu  Glu Asn Leu Val Asn  Ser Leu Val Thr Ala  Gly His Gly
    1115                1120                1125

Gln Val  Asp Asn Phe Ser Leu  Gly Val Leu Gly Met  Ala Leu Phe
    1130                1135                1140

Leu Glu  Glu Met Leu Arg Thr  Arg Val Gly Thr Lys  His Ala Ile
    1145                1150                1155
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Leu Leu  Val Ala Val Ser Phe  Val Thr Leu Ile Thr  Gly Asn Met
    1160                 1165                 1170

Ser Phe  Arg Asp Leu Gly Arg  Val Met Val Met Val  Gly Ala Thr
    1175                 1180                 1185

Met Thr  Asp Asp Ile Gly Met  Gly Val Thr Tyr Leu  Ala Leu Leu
    1190                 1195                 1200

Ala Ala  Phe Lys Val Arg Pro  Thr Phe Ala Ala Gly  Leu Leu Leu
    1205                 1210                 1215

Arg Lys  Leu Thr Ser Lys Glu  Leu Met Met Thr Thr  Ile Gly Ile
    1220                 1225                 1230

Val Leu  Leu Ser Gln Ser Thr  Ile Pro Glu Thr Ile  Leu Glu Leu
    1235                 1240                 1245

Thr Asp  Ala Leu Ala Leu Gly  Met Met Val Leu Lys  Met Val Arg
    1250                 1255                 1260

Asn Met  Glu Lys Tyr Gln Leu  Ala Val Thr Ile Met  Ala Ile Leu
    1265                 1270                 1275

Cys Val  Pro Asn Ala Val Ile  Leu Gln Asn Ala Trp  Lys Val Ser
    1280                 1285                 1290

Cys Thr  Ile Leu Ala Val Val  Ser Val Ser Pro Leu  Phe Leu Thr
    1295                 1300                 1305

Ser Ser  Gln Gln Lys Thr Asp  Trp Ile Pro Leu Ala  Leu Thr Ile
    1310                 1315                 1320

Lys Gly  Leu Asn Pro Thr Ala  Ile Phe Leu Thr Thr  Leu Ser Arg
    1325                 1330                 1335

Thr Ser  Lys Lys Arg Ser Trp  Pro Leu Asn Glu Ala  Ile Met Ala
    1340                 1345                 1350

Val Gly  Met Val Ser Ile Leu  Ala Ser Ser Leu Leu  Lys Asn Asp
    1355                 1360                 1365

Ile Pro  Met Thr Gly Pro Leu  Val Ala Gly Gly Leu  Leu Thr Val
    1370                 1375                 1380

Cys Tyr  Val Leu Thr Gly Arg  Ser Ala Asp Leu Glu  Leu Glu Arg
    1385                 1390                 1395

Ala Ala  Asp Val Lys Trp Glu  Asp Gln Ala Glu Ile  Ser Gly Ser
    1400                 1405                 1410
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Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser Met Ser
1415 1420 1425

Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu Ile Arg
1430 1435 1440

Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser Ile Pro
1445 1450 1455

Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys Gln Arg
1460 1465 1470

Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met Gly Lys
1475 1480 1485

Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys Gly Ile
1490 1495 1500

Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu Gly Thr
1505 1510 1515

Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu Met His
1520 1525 1530

Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys Lys Asp
1535 1540 1545

Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu Trp Lys
1550 1555 1560

Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly Lys Asn
1565 1570 1575

Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Asn Ala
1580 1585 1590

Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly Thr Ser
1595 1600 1605

Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly Leu Tyr
1610 1615 1620

Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser Ala Ile
1625 1630 1635

Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile Glu Asp
1640 1645 1650

Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu His Pro
1655 1660 1665

Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val Arg Glu
1670 1675 1680

Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro Thr Arg
1685 1690 1695

Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro Ile
1700 1705 1710

Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly Arg Glu
1715 1720 1725

Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg Leu Leu
1730 1735 1740

Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met Asp Glu
1745 1750 1755

Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly Tyr Ile
1760 1765 1770

Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe Met Thr
1775 1780 1785

Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser Asn Ala
1790 1795 1800

Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser Trp Asn
1805 1810 1815

Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr Val Trp
1820 1825 1830

Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala Cys Leu
1835 1840 1845

Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys Thr Phe
1850 1855 1860

Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp Phe Val
1865 1870 1875

Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys Ala Glu
1880 1885 1890

Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile Leu Thr
1895 1900 1905

Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro Val Thr
1910 1915 1920

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His Ser  Ser Ala Ala Gln Arg  Arg Gly Arg Ile Gly  Arg Asn Pro
    1925                 1930                 1935

Lys Asn  Glu Asn Asp Gln Tyr  Ile Tyr Met Gly Glu  Pro Leu Glu
    1940                 1945                 1950

Asn Asp  Glu Asp Cys Ala His  Trp Lys Glu Ala Lys  Met Leu Leu
    1955                 1960                 1965

Asp Asn  Ile Asn Thr Pro Glu  Gly Ile Ile Pro Ser  Met Phe Glu
    1970                 1975                 1980

Pro Glu  Arg Glu Lys Val Asp  Ala Ile Asp Gly Glu  Tyr Arg Leu
    1985                 1990                 1995

Arg Gly  Glu Ala Arg Lys Thr  Phe Val Asp Leu Met  Arg Arg Gly
    2000                 2005                 2010

Asp Leu  Pro Val Trp Leu Ala  Tyr Arg Val Ala Ala  Glu Gly Ile
    2015                 2020                 2025

Asn Tyr  Ala Asp Arg Arg Trp  Cys Phe Asp Gly Val  Lys Asn Asn
    2030                 2035                 2040

Gln Ile  Leu Glu Glu Asn Val  Glu Val Glu Ile Trp  Thr Lys Glu
    2045                 2050                 2055

Gly Glu  Arg Lys Lys Leu Lys  Pro Arg Trp Leu Asp  Ala Arg Ile
    2060                 2065                 2070

Tyr Ser  Asp Pro Leu Ala Leu  Lys Glu Phe Lys Glu  Phe Ala Ala
    2075                 2080                 2085

Gly Arg  Lys Ser Leu Thr Leu  Asn Leu Ile Thr Glu  Met Gly Arg
    2090                 2095                 2100

Leu Pro  Thr Phe Met Thr Gln  Lys Ala Arg Asn Ala  Leu Asp Asn
    2105                 2110                 2115

Leu Ala  Val Leu His Thr Ala  Glu Ala Gly Gly Arg  Ala Tyr Asn
    2120                 2125                 2130

His Ala  Leu Ser Glu Leu Pro  Glu Thr Leu Glu Thr  Leu Leu Leu
    2135                 2140                 2145

Leu Thr  Leu Leu Ala Thr Val  Thr Gly Gly Ile Phe  Leu Phe Leu
    2150                 2155                 2160

Met Ser  Ala Arg Gly Ile Gly  Lys Met Thr Leu Gly  Met Cys Cys
    2165                 2170                 2175
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Ile Ile  Thr Ala Ser Ile Leu  Leu Trp Tyr Ala Gln  Ile Gln Pro
    2180                 2185                 2190

His Trp  Ile Ala Ala Ser Ile  Ile Leu Glu Phe Phe  Leu Ile Val
    2195                 2200                 2205

Leu Leu  Ile Pro Glu Pro Glu  Lys Gln Arg Thr Pro  Gln Asp Asn
    2210                 2215                 2220

Gln Leu  Thr Tyr Val Val Ile  Ala Ile Leu Thr Val  Val Ala Ala
    2225                 2230                 2235

Thr Met  Ala Asn Glu Met Gly  Phe Leu Glu Lys Thr  Lys Lys Asp
    2240                 2245                 2250

Leu Gly  Leu Gly Ser Ile Ala  Thr Gln Gln Pro Glu  Ser Asn Ile
    2255                 2260                 2265

Leu Asp  Ile Asp Leu Arg Pro  Ala Ser Ala Trp Thr  Leu Tyr Ala
    2270                 2275                 2280

Val Ala  Thr Thr Phe Val Thr  Pro Met Leu Arg His  Ser Ile Glu
    2285                 2290                 2295

Asn Ser  Ser Val Asn Val Ser  Leu Thr Ala Ile Ala  Asn Gln Ala
    2300                 2305                 2310

Thr Val  Leu Met Gly Leu Gly  Lys Gly Trp Pro Leu  Ser Lys Met
    2315                 2320                 2325

Asp Ile  Gly Val Pro Leu Leu  Ala Ile Gly Cys Tyr  Ser Gln Val
    2330                 2335                 2340

Asn Pro  Ile Thr Leu Thr Ala  Ala Leu Phe Leu Leu  Val Ala His
    2345                 2350                 2355

Tyr Ala  Ile Ile Gly Pro Gly  Leu Gln Ala Lys Ala  Thr Arg Glu
    2360                 2365                 2370

Ala Gln  Lys Arg Ala Ala Ala  Gly Ile Met Lys Asn  Pro Thr Val
    2375                 2380                 2385

Asp Gly  Ile Thr Val Ile Asp  Leu Asp Pro Ile Pro  Tyr Asp Pro
    2390                 2395                 2400

Lys Phe  Glu Lys Gln Leu Gly  Gln Val Met Leu Leu  Val Leu Cys
    2405                 2410                 2415

Val Thr  Gln Val Leu Met Met  Arg Thr Thr Trp Ala  Leu Cys Glu
    2420                 2425                 2430
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Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp Glu Gly
    2435                2440                2445

Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser Met Ala
    2450                2455                2460

Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Leu Phe
    2465                2470                2475

Ser Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr Gly Asn
    2480                2485                2490

Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu Asn Ala
    2495                2500                2505

Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly Ile Gln
    2510                2515                2520

Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg Gly Glu
    2525                2530                2535

Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu Arg Trp
    2540                2545                2550

Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val Val Asp
    2555                2560                2565

Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly Gly Leu
    2570                2575                2580

Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly Pro Gly
    2585                2590                2595

His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn Leu Val
    2600                2605                2610

Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro Glu Lys
    2615                2620                2625

Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro Asn Pro
    2630                2635                2640

Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu Val Glu
    2645                2650                2655

Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val Leu Asn
    2660                2665                2670

Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu Gln Arg
    2675                2680                2685
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Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg Asn Ser
2690 2695 2700

Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn Ile Val
2705 2710 2715

Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg Phe Thr
2720 2725 2730

Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp Leu Gly
2735 2740 2745

Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro Asn Leu
2750 2755 2760

Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu His Glu
2765 2770 2775

Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr Trp Ala
2780 2785 2790

Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala Ser Ser
2795 2800 2805

Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp Asp Val
2810 2815 2820

Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr Pro Phe
2825 2830 2835

Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Gln
2840 2845 2850

Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr Ala Glu
2855 2860 2865

Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg Met Cys
2870 2875 2880

Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala Ala Leu
2885 2890 2895

Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala Arg Glu
2900 2905 2910

Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys Glu Arg
2915 2920 2925

Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr Asn Met
2930 2935 2940

Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys Ala Lys
2945 2950 2955

Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Phe Leu
2960 2965 2970

Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser
2975 2980 2985

Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu His Lys
2990 2995 3000

Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly Gly Ala
3005 3010 3015

Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Leu
3020 3025 3030

Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met Glu Gly
3035 3040 3045

Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr Tyr Gln
3050 3055 3060

Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly Thr Val
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Ala Gly Ala Pro Cys Lys Val Pro Ile Glu Ile Arg Asp Val Asn Lys
    610                 615                 620

Glu Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Leu Ala Glu Asn
625                 630                 635                 640

Thr Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe
            660                 665                 670

Arg Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Val Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe
705                 710                 715                 720
```

```
Gly Ser Val Tyr Thr Thr Leu Phe Gly Gly Val Ser Trp Met Ile Arg
                725                 730                 735

Ile Leu Ile Gly Phe Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn
            740                 745                 750

Thr Ser Met Ala Met Thr Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990
```

```
Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065

Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                1090                1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                1105                1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                1120                1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                1135                1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                1150                1155

Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                1165                1170

Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                1180                1185

Ala Thr  Met Thr Gly Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
    1190                1195                1200

Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
    1205                1210                1215

Leu Leu  Arg Lys Leu Thr Ser  Lys Glu Leu Met Met  Thr Thr Ile
    1220                1225                1230

Gly Ile  Val Leu Leu Ser Gln  Ser Thr Ile Pro Glu  Thr Ile Leu
    1235                1240                1245
```

```
Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
    1250                1255                1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
    1265                1270                1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
    1280                1285                1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
    1295                1300                1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
    1310                1315                1320

Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
    1325                1330                1335

Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
    1340                1345                1350

Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
    1355                1360                1365

Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
    1370                1375                1380

Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
    1385                1390                1395

Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
    1400                1405                1410

Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
    1415                1420                1425

Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
    1430                1435                1440

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
    1445                1450                1455

Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
    1460                1465                1470

Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
    1475                1480                1485

Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
    1490                1495                1500
```

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Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                1510                1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                1525                1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                1540                1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                1555                1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                1570                1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                1585                1590

Asn Ala  Gly Thr Ile Gly Ala  Val Ser Leu Asp Phe  Ser Pro Gly
    1595                1600                1605

Thr Ser  Gly Ser Pro Ile Ile  Asp Lys Lys Gly Lys  Val Val Gly
    1610                1615                1620

Leu Tyr  Gly Asn Gly Val Val  Thr Arg Ser Gly Ala  Tyr Val Ser
    1625                1630                1635

Ala Ile  Ala Gln Thr Glu Lys  Ser Ile Glu Asp Asn  Pro Glu Ile
    1640                1645                1650

Glu Asp  Asp Ile Phe Arg Lys  Arg Arg Leu Thr Ile  Met Asp Leu
    1655                1660                1665

His Pro  Gly Ala Gly Lys Thr  Lys Arg Tyr Leu Pro  Ala Ile Val
    1670                1675                1680

Arg Glu  Ala Ile Lys Arg Gly  Leu Arg Thr Leu Ile  Leu Ala Pro
    1685                1690                1695

Thr Arg  Val Val Ala Ala Glu  Met Glu Glu Ala Leu  Arg Gly Leu
    1700                1705                1710

Pro Ile  Arg Tyr Gln Thr Pro  Ala Ile Arg Ala Val  His Thr Gly
    1715                1720                1725

Arg Glu  Ile Val Asp Leu Met  Cys His Ala Thr Phe  Thr Met Arg
    1730                1735                1740

Leu Leu  Ser Pro Val Arg Val  Pro Asn Tyr Asn Leu  Ile Ile Met
    1745                1750                1755
```

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Asp Glu  Ala His Phe Thr Asp  Pro Ala Ser Ile Ala  Ala Arg Gly
    1760                 1765                 1770

Tyr Ile  Ser Thr Arg Val Glu  Met Gly Glu Ala Ala  Gly Ile Phe
    1775                 1780                 1785

Met Thr  Ala Thr Pro Pro Gly  Ser Arg Asp Pro Phe  Pro Gln Ser
    1790                 1795                 1800

Asn Ala  Pro Ile Ile Asp Glu  Glu Arg Glu Ile Pro  Glu Arg Ser
    1805                 1810                 1815

Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
    1820                 1825                 1830

Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
    1835                 1840                 1845

Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
    1850                 1855                 1860

Thr Phe  Asp Ser Glu Tyr Val  Lys Thr Arg Thr Asn  Asp Trp Asp
    1865                 1870                 1875

Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                 1885                 1890

Ala Glu  Arg Val Ile Asp Pro  Arg Arg Cys Met Lys  Pro Val Ile
    1895                 1900                 1905

Leu Thr  Asp Gly Glu Glu Arg  Val Ile Leu Ala Gly  Pro Met Pro
    1910                 1915                 1920

Val Thr  His Ser Ser Ala Ala  Gln Arg Arg Gly Arg  Ile Gly Arg
    1925                 1930                 1935

Asn Pro  Lys Asn Glu Asn Asp  Gln Tyr Ile Tyr Met  Gly Glu Pro
    1940                 1945                 1950

Leu Glu  Asn Asp Glu Asp Cys  Ala His Trp Lys Glu  Ala Lys Met
    1955                 1960                 1965

Leu Leu  Asp Asn Ile Asn Thr  Pro Glu Gly Ile Ile  Pro Ser Met
    1970                 1975                 1980

Phe Glu  Pro Glu Arg Glu Lys  Val Asp Ala Ile Asp  Gly Glu Tyr
    1985                 1990                 1995

Arg Leu  Arg Gly Glu Ala Arg  Lys Thr Phe Val Asp  Leu Met Arg
    2000                 2005                 2010
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Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
    2015                2020                2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
    2030                2035                2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
    2045                2050                2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
    2060                2065                2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
    2075                2080                2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
    2090                2095                2100

Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Val Arg Asp Ala Leu
    2105                2110                2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
    2120                2125                2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
    2135                2140                2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
    2150                2155                2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
    2165                2170                2175

Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
    2180                2185                2190

Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
    2195                2200                2205

Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
    2210                2215                2220

Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
    2225                2230                2235

Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
    2240                2245                2250

Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
    2255                2260                2265
```

```
Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                 2275                 2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                 2290                 2295

Ile Glu  Asn Ser Ser Val Asn  Val Ser Leu Thr Ala  Ile Ala Asn
    2300                 2305                 2310

Gln Ala  Thr Val Leu Met Gly  Leu Gly Lys Gly Trp  Pro Leu Ser
    2315                 2320                 2325

Lys Met  Asp Ile Gly Val Pro  Leu Leu Ala Ile Gly  Cys Tyr Ser
    2330                 2335                 2340

Gln Val  Asn Pro Ile Thr Leu  Thr Ala Ala Leu Phe  Leu Leu Val
    2345                 2350                 2355

Ala His  Tyr Ala Ile Ile Gly  Pro Gly Leu Gln Ala  Lys Ala Thr
    2360                 2365                 2370

Arg Glu  Ala Gln Lys Arg Ala  Ala Ala Gly Ile Met  Lys Asn Pro
    2375                 2380                 2385

Thr Val  Asp Gly Ile Thr Val  Ile Asp Leu Asp Pro  Ile Pro Tyr
    2390                 2395                 2400

Asp Pro  Lys Phe Glu Lys Gln  Leu Gly Gln Val Met  Leu Leu Val
    2405                 2410                 2415

Leu Cys  Val Thr Gln Val Leu  Met Met Arg Thr Thr  Trp Ala Leu
    2420                 2425                 2430

Cys Glu  Ala Leu Thr Leu Ala  Thr Gly Pro Ile Ser  Thr Leu Trp
    2435                 2440                 2445

Glu Gly  Asn Pro Gly Arg Phe  Trp Asn Thr Thr Ile  Ala Val Ser
    2450                 2455                 2460

Met Ala  Asn Ile Phe Arg Gly  Ser Tyr Leu Ala Gly  Ala Gly Leu
    2465                 2470                 2475

Leu Phe  Ser Ile Met Lys Asn  Thr Thr Asn Thr Arg  Arg Gly Thr
    2480                 2485                 2490

Gly Asn  Ile Gly Glu Thr Leu  Gly Glu Lys Trp Lys  Ser Arg Leu
    2495                 2500                 2505

Asn Ala  Leu Gly Lys Ser Glu  Phe Gln Ile Tyr Lys  Lys Ser Gly
    2510                 2515                 2520
```

```
Ile Gln  Glu Val Asp Arg Thr  Leu Ala Lys Glu Gly  Ile Lys Arg
    2525                 2530                 2535

Gly Glu  Thr Asp His His Ala  Val Ser Arg Gly Ser  Ala Lys Leu
    2540                 2545                 2550

Arg Trp  Phe Val Glu Arg Asn  Met Val Thr Pro Glu  Gly Lys Val
    2555                 2560                 2565

Val Asp  Leu Gly Cys Gly Arg  Gly Gly Trp Ser Tyr  Tyr Cys Gly
    2570                 2575                 2580

Gly Leu  Lys Asn Val Arg Glu  Val Lys Gly Leu Thr  Lys Gly Gly
    2585                 2590                 2595

Pro Gly  His Glu Glu Pro Ile  Pro Met Ser Thr Tyr  Gly Trp Asn
    2600                 2605                 2610

Leu Val  Arg Leu Gln Ser Gly  Val Asp Val Phe Phe  Ile Pro Pro
    2615                 2620                 2625

Glu Lys  Cys Asp Thr Leu Leu  Cys Asp Ile Gly Glu  Ser Ser Pro
    2630                 2635                 2640

Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
    2645                 2650                 2655

Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
    2660                 2665                 2670

Leu Asn  Pro Tyr Met Pro Ser  Val Ile Glu Lys Met  Glu Ala Leu
    2675                 2680                 2685

Gln Arg  Lys Tyr Gly Gly Ala  Leu Val Arg Asn Pro  Leu Ser Arg
    2690                 2695                 2700

Asn Ser  Thr His Glu Met Tyr  Trp Val Ser Asn Ala  Ser Gly Asn
    2705                 2710                 2715

Ile Val  Ser Ser Val Asn Met  Ile Ser Arg Met Leu  Ile Asn Arg
    2720                 2725                 2730

Phe Thr  Met Arg Tyr Lys Lys  Ala Thr Tyr Glu Pro  Asp Val Asp
    2735                 2740                 2745

Leu Gly  Ser Gly Thr Arg Asn  Ile Gly Ile Glu Ser  Glu Ile Pro
    2750                 2755                 2760

Asn Leu  Asp Ile Ile Gly Lys  Arg Ile Glu Lys Ile  Lys Gln Glu
    2765                 2770                 2775
```

```
His Glu  Thr Ser Trp His Tyr  Asp Gln Asp His Pro  Tyr Lys Thr
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Trp Ala  Tyr His Gly Ser Tyr  Glu Thr Lys Gln Thr  Gly Ser Ala
    2795                 2800                 2805

Ser Ser  Met Val Asn Gly Val  Val Arg Leu Leu Thr  Lys Pro Trp
    2810                 2815                 2820

Asp Val  Val Pro Met Val Thr  Gln Met Ala Met Thr  Asp Thr Thr
    2825                 2830                 2835

Pro Phe  Gly Gln Gln Arg Val  Phe Lys Glu Lys Val  Asp Thr Arg
    2840                 2845                 2850

Thr Gln  Glu Pro Lys Glu Gly  Thr Lys Lys Leu Met  Lys Ile Thr
    2855                 2860                 2865

Ala Glu  Trp Leu Trp Lys Glu  Leu Gly Lys Lys Lys  Thr Pro Arg
    2870                 2875                 2880

Met Cys  Thr Arg Glu Glu Phe  Thr Arg Lys Val Arg  Ser Asn Ala
    2885                 2890                 2895

Ala Leu  Gly Ala Ile Phe Thr  Asp Glu Asn Lys Trp  Lys Ser Ala
    2900                 2905                 2910

Arg Glu  Ala Val Glu Asp Ser  Arg Phe Trp Glu Leu  Val Asp Lys
    2915                 2920                 2925

Glu Arg  Asn Leu His Leu Glu  Gly Lys Cys Glu Thr  Cys Val Tyr
    2930                 2935                 2940

Asn Met  Met Gly Lys Arg Glu  Lys Lys Leu Gly Glu  Phe Gly Lys
    2945                 2950                 2955

Ala Lys  Gly Ser Arg Ala Ile  Trp Tyr Met Trp Leu  Gly Ala Arg
    2960                 2965                 2970

Phe Leu  Glu Phe Glu Ala Leu  Gly Phe Leu Asn Glu  Asp His Trp
    2975                 2980                 2985

Phe Ser  Arg Glu Asn Ser Leu  Ser Gly Val Glu Gly  Glu Gly Leu
    2990                 2995                 3000

His Lys  Leu Gly Tyr Ile Leu  Arg Asp Val Ser Lys  Lys Glu Gly
    3005                 3010                 3015

Gly Ala  Met Tyr Ala Asp Asp  Thr Ala Gly Trp Asp  Thr Arg Ile
    3020                 3025                 3030
```

```
Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
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Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
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Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
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Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
3080                 3085                 3090

Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
3095                 3100                 3105

Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
3110                 3115                 3120

Gln His Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu
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Ala Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
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Asp Asp Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala
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Leu Thr Ala Leu Asn Asp Met Gly Lys Ile Arg Lys Asp Ile Gln
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Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
3185                 3190                 3195

Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
3200                 3205                 3210

Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
3215                 3220                 3225

Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
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Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
3245                 3250                 3255

His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
3260                 3265                 3270

Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
3275                 3280                 3285
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His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
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Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
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Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
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Thr Trp Ala Lys Asn Ile Gln Ala Ala Ile Asn Gln Val Arg Ser
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Lys Arg Glu Arg Asn Arg Val Ser Thr Val Gln Gln Leu Thr Lys Arg
            20                  25                  30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
        35                  40                  45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
    50                  55                  60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65                  70                  75                  80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
                85                  90                  95

Arg Arg Arg Ser Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
            100                 105                 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Leu Met Ile Val
        115                 120                 125

Ala Lys His Glu Arg Gly Arg Pro Leu Leu Phe Lys Thr Thr Glu Gly
    130                 135                 140

Ile Asn Lys Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Glu
145                 150                 155                 160

Asp Thr Val Thr Tyr Lys Cys Pro Leu Leu Val Asn Thr Glu Pro Glu
                165                 170                 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Met Tyr Gly
            180                 185                 190

Thr Cys Thr Gln Ser Gly Glu Arg Arg Arg Glu Lys Arg Ser Val Ala
        195                 200                 205

Leu Thr Pro His Ser Gly Met Gly Leu Glu Thr Arg Ala Glu Thr Trp
    210                 215                 220

Met Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Val Glu Ser Trp
225                 230                 235                 240
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Ile Leu Arg Asn Pro Gly Phe Ala Leu Leu Ala Gly Phe Met Ala Tyr
                245                 250                 255

Met Ile Gly Gln Thr Gly Ile Gln Arg Thr Val Phe Phe Val Leu Met
            260                 265                 270

Met Leu Val Ala Pro Ser Tyr Gly Met Arg Cys Val Gly Val Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ala Trp Val Asp Leu Val
    290                 295                 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Gln Gly Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Thr Lys Thr Thr Ala Lys Glu Val Ala Leu Leu
                325                 330                 335

Arg Thr Tyr Cys Ile Glu Ala Ser Ile Ser Asn Ile Thr Thr Ala Thr
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Pro Tyr Leu Lys Glu Glu Gln Asp Gln
        355                 360                 365

Gln Tyr Ile Cys Arg Arg Asp Val Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Val Val Thr Cys Ala Lys Phe Ser
385                 390                 395                 400

Cys Ser Gly Lys Ile Thr Gly Asn Leu Val Gln Ile Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Val Val Val Thr Val His Asn Gly Asp Thr His Ala Val Gly
            420                 425                 430

Asn Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser
        435                 440                 445

Pro Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp
    450                 455                 460

Cys Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys
465                 470                 475                 480

Met Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn
            500                 505                 510
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Tyr Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln
515 520 525

Asp Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu
530 535 540

Ala Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala
545 550 555 560

Gly His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly
565 570 575

Met Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met
580 585 590

Ala Glu Thr Gln His Gly Thr Thr Val Val Lys Val Lys Tyr Glu Gly
595 600 605

Ala Gly Ala Pro Cys Lys Val Pro Ile Glu Ile Arg Asp Val Asn Lys
610 615 620

Glu Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Leu Ala Glu Asn
625 630 635 640

Thr Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
645 650 655

Tyr Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe
660 665 670

Arg Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly
675 680 685

Ala Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser
690 695 700

Val Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe
705 710 715 720

Gly Ser Val Tyr Thr Thr Leu Phe Gly Gly Val Ser Trp Met Ile Arg
725 730 735

Ile Leu Ile Gly Phe Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn
740 745 750

Thr Ser Met Ala Met Thr Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
755 760 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
770 775 780

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Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050
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Phe Cys Asp Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
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Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
1070 1075 1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
1085 1090 1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
1115 1120 1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
1130 1135 1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
1145 1150 1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
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Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
1175 1180 1185

Ala Thr Met Thr Gly Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
1190 1195 1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
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Leu Leu Arg Lys Leu Thr Ser Xaa Glu Leu Met Met Thr Thr Ile
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Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
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Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
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Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
1265 1270 1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
1280 1285 1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
1295 1300 1305

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Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
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Thr Ile  Lys Gly Leu Asn Pro  Thr Ala Ile Phe Leu  Thr Thr Leu
    1325                 1330                 1335

Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                 1345                 1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                 1360                 1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                 1375                 1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                 1390                 1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                 1405                 1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Glu Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                 1555                 1560
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Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
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Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
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Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
    1595                1600                1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
    1610                1615                1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
    1625                1630                1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
    1640                1645                1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
    1655                1660                1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
    1670                1675                1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
    1685                1690                1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
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Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
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Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
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Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
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Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
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Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
    1775                1780                1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
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Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
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Trp Asn  Ser Gly His Glu Trp  Val Thr Asp Phe Lys  Gly Lys Thr
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Val Trp  Phe Val Pro Ser Ile  Lys Ala Gly Asn Asp  Ile Ala Ala
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Cys Leu  Arg Lys Asn Gly Lys  Lys Val Ile Gln Leu  Ser Arg Lys
    1850                 1855                 1860

Thr Phe  Asp Ser Glu Tyr Val  Lys Thr Arg Thr Asn  Asp Trp Asp
    1865                 1870                 1875

Phe Val  Val Thr Thr Asp Ile  Ser Glu Met Gly Ala  Asn Phe Lys
    1880                 1885                 1890

Ala Glu  Arg Val Ile Asp Pro  Arg Arg Cys Met Lys  Pro Val Ile
    1895                 1900                 1905

Leu Thr  Asp Gly Glu Glu Arg  Val Ile Leu Ala Gly  Pro Met Pro
    1910                 1915                 1920

Val Thr  His Ser Ser Ala Ala  Gln Arg Arg Gly Arg  Ile Gly Arg
    1925                 1930                 1935

Asn Pro  Lys Asn Glu Asn Asp  Gln Tyr Ile Tyr Met  Gly Glu Pro
    1940                 1945                 1950

Leu Glu  Asn Asp Glu Asp Cys  Ala His Trp Lys Glu  Ala Lys Met
    1955                 1960                 1965

Leu Leu  Asp Asn Ile Asn Thr  Pro Glu Gly Ile Ile  Pro Ser Met
    1970                 1975                 1980

Phe Glu  Pro Glu Arg Glu Lys  Val Asp Ala Ile Asp  Gly Glu Tyr
    1985                 1990                 1995

Arg Leu  Arg Gly Glu Ala Arg  Lys Thr Phe Val Asp  Leu Met Arg
    2000                 2005                 2010

Arg Gly  Asp Leu Pro Val Trp  Leu Ala Tyr Arg Val  Ala Ala Glu
    2015                 2020                 2025

Gly Ile  Asn Tyr Ala Asp Arg  Arg Trp Cys Phe Asp  Gly Val Lys
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Asn Asn  Gln Ile Leu Glu Glu  Asn Val Glu Val Glu  Ile Trp Thr
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Lys Glu  Gly Glu Arg Lys Lys  Leu Lys Pro Arg Trp  Leu Asp Ala
    2060                 2065                 2070
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Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
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Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
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Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Val Arg Asp Ala Leu
    2105                2110                2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
    2120                2125                2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
    2135                2140                2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
    2150                2155                2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
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Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
    2180                2185                2190

Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
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Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
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Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
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Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
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Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
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Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
    2270                2275                2280

Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
    2285                2290                2295

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
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Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
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Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
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Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
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Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570 2575 2580

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Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
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Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
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Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
    2630                2635                2640

Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
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Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
    2660                2665                2670

Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
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Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
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Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
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Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
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Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
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Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
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Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
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His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
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Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
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Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
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Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
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Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
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Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
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Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
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Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
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Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu
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His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
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Gly Ala Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile
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Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
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Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
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Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
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Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
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gaaaggaatc tccatcttga aggaaagtgt gaaacatgtg tgtacaacat gatgggaaaa 8940

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20 25 30

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
85 90 95

Arg Arg Arg Ser Ser Ala Gly Met Ile Ile Met Leu Ile Pro Thr Val
100 105 110

Met Ala Phe His Leu Thr Thr Arg Asp Gly Glu Pro Leu Met Ile Val
115 120 125

Ala Lys His Glu Arg Gly Arg Pro Leu Leu Phe Lys Thr Thr Glu Gly
130 135 140

Ile Asn Lys Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Glu
145 150 155 160

Asp Thr Val Thr Tyr Lys Cys Pro Leu Leu Val Asn Thr Glu Pro Glu
165 170 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Met Tyr Gly
180 185 190

Thr Cys Thr Gln Ser Gly Glu Arg Arg Arg Glu Lys Arg Ser Val Ala
195 200 205

Leu Thr Pro His Ser Gly Met Gly Leu Glu Thr Arg Ala Glu Thr Trp
210 215 220

Met Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Val Glu Ser Trp
225 230 235 240

Ile Leu Arg Asn Pro Gly Phe Ala Leu Leu Ala Gly Phe Met Ala Tyr
245 250 255

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Met Ile Gly Gln Thr Gly Ile Gln Arg Thr Val Phe Phe Val Leu Met
            260                 265                 270

Met Leu Val Ala Pro Ser Tyr Gly Met Arg Cys Val Gly Val Gly Asn
        275                 280                 285

Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ala Trp Val Asp Leu Val
    290                 295                 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Gln Gly Lys Pro Thr
305                 310                 315                 320

Leu Asp Phe Glu Leu Thr Lys Thr Thr Ala Lys Glu Val Ala Leu Leu
                325                 330                 335

Arg Thr Tyr Cys Ile Glu Ala Ser Ile Ser Asn Ile Thr Thr Ala Thr
            340                 345                 350

Arg Cys Pro Thr Gln Gly Glu Pro Tyr Leu Lys Glu Glu Gln Asp Gln
        355                 360                 365

Gln Tyr Ile Cys Arg Arg Asp Val Val Asp Arg Gly Trp Gly Asn Gly
    370                 375                 380

Cys Gly Leu Phe Gly Lys Gly Gly Val Val Thr Cys Ala Lys Phe Ser
385                 390                 395                 400

Cys Ser Gly Lys Ile Thr Gly Asn Leu Val Gln Ile Glu Asn Leu Glu
                405                 410                 415

Tyr Thr Val Val Val Thr Val His Asn Gly Asp Thr His Ala Val Gly
            420                 425                 430

Asn Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser
        435                 440                 445

Pro Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp
    450                 455                 460

Cys Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys
465                 470                 475                 480

Met Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn
            500                 505                 510

Tyr Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln
        515                 520                 525
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Asp Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu
    530                 535                 540

Ala Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly
                565                 570                 575

Met Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Thr Val Val Lys Val Lys Tyr Glu Gly
        595                 600                 605

Ala Gly Ala Pro Cys Lys Val Pro Ile Glu Ile Arg Asp Val Asn Lys
    610                 615                 620

Glu Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Leu Ala Glu Asn
625                 630                 635                 640

Thr Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe
            660                 665                 670

Arg Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Val Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe
705                 710                 715                 720

Gly Ser Val Tyr Thr Thr Leu Phe Gly Gly Val Ser Trp Met Ile Arg
                725                 730                 735

Ile Leu Ile Gly Phe Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn
            740                 745                 750

Thr Ser Met Ala Met Thr Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800
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His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065
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Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                 1075                 1080

Thr Glu  Trp Cys Cys Arg Ser  Cys Thr Leu Pro Pro  Leu Arg Tyr
    1085                 1090                 1095

Arg Gly  Glu Asp Gly Cys Trp  Tyr Gly Met Glu Ile  Arg Pro Leu
    1100                 1105                 1110

Lys Glu  Lys Glu Glu Asn Leu  Val Asn Ser Leu Val  Thr Ala Gly
    1115                 1120                 1125

His Gly  Gln Val Asp Asn Phe  Ser Leu Gly Val Leu  Gly Met Ala
    1130                 1135                 1140

Leu Phe  Leu Glu Glu Met Leu  Arg Thr Arg Val Gly  Thr Lys His
    1145                 1150                 1155

Ala Ile  Leu Leu Val Ala Val  Ser Phe Val Thr Leu  Ile Thr Gly
    1160                 1165                 1170

Asn Met  Ser Phe Arg Asp Leu  Gly Arg Val Met Val  Met Val Gly
    1175                 1180                 1185

Ala Thr  Met Thr Gly Asp Ile  Gly Met Gly Val Thr  Tyr Leu Ala
    1190                 1195                 1200

Leu Leu  Ala Ala Phe Lys Val  Arg Pro Thr Phe Ala  Ala Gly Leu
    1205                 1210                 1215

Leu Leu  Arg Lys Leu Thr Ser  Xaa Glu Leu Met Met  Thr Thr Ile
    1220                 1225                 1230

Gly Ile  Val Leu Leu Ser Gln  Ser Thr Ile Pro Glu  Thr Ile Leu
    1235                 1240                 1245

Glu Leu  Thr Asp Ala Leu Ala  Leu Gly Met Met Val  Leu Lys Met
    1250                 1255                 1260

Val Arg  Asn Met Glu Lys Tyr  Gln Leu Ala Val Thr  Ile Met Ala
    1265                 1270                 1275

Ile Leu  Cys Val Pro Asn Ala  Val Ile Leu Gln Asn  Ala Trp Lys
    1280                 1285                 1290

Val Ser  Cys Thr Ile Leu Ala  Val Val Ser Val Ser  Pro Leu Phe
    1295                 1300                 1305

Leu Thr  Ser Ser Gln Gln Lys  Thr Asp Trp Ile Pro  Leu Ala Leu
    1310                 1315                 1320
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Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
1325                 1330                 1335

Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
1340                 1345                 1350

Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
1355                 1360                 1365

Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
1370                 1375                 1380

Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
1385                 1390                 1395

Glu Arg Ala Ala Asp Val Lys Trp Glu Asp Gln Ala Glu Ile Ser
1400                 1405                 1410

Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
1415                 1420                 1425

Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
1430                 1435                 1440

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Val Ser
1445                 1450                 1455

Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
1460                 1465                 1470

Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Met
1475                 1480                 1485

Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
1490                 1495                 1500

Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
1505                 1510                 1515

Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
1520                 1525                 1530

Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
1535                 1540                 1545

Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
1550                 1555                 1560

Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
1565                 1570                 1575
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Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
1580 1585 1590

Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
1595 1600 1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
1610 1615 1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
1625 1630 1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
1640 1645 1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
1655 1660 1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
1670 1675 1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
1685 1690 1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
1700 1705 1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
1715 1720 1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
1730 1735 1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
1745 1750 1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
1760 1765 1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
1775 1780 1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
1790 1795 1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
1805 1810 1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
1820 1825 1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
1835 1840 1845

Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
1850 1855 1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
1865 1870 1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
1880 1885 1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
1895 1900 1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
1910 1915 1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
1925 1930 1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
1940 1945 1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
1955 1960 1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
1970 1975 1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
1985 1990 1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
2000 2005 2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
2015 2020 2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
2030 2035 2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
2045 2050 2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
2060 2065 2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
2075 2080 2085

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Ala Ala  Gly Arg Lys Ser Leu  Thr Leu Asn Leu Ile  Thr Glu Met
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Gly Arg  Leu Pro Thr Phe Met  Thr Gln Lys Val Arg  Asp Ala Leu
    2105                 2110                 2115

Asp Asn  Leu Ala Val Leu His  Thr Ala Glu Ala Gly  Gly Arg Ala
    2120                 2125                 2130

Tyr Asn  His Ala Leu Ser Glu  Leu Pro Glu Thr Leu  Glu Thr Leu
    2135                 2140                 2145

Leu Leu  Leu Thr Leu Leu Ala  Thr Val Thr Gly Gly  Ile Phe Leu
    2150                 2155                 2160

Phe Leu  Met Ser Ala Arg Gly  Ile Gly Lys Met Thr  Leu Gly Met
    2165                 2170                 2175

Cys Cys  Ile Ile Thr Ala Ser  Ile Leu Leu Trp Tyr  Ala Gln Ile
    2180                 2185                 2190

Gln Pro  His Trp Ile Ala Ala  Ser Ile Ile Leu Glu  Phe Phe Leu
    2195                 2200                 2205

Ile Val  Leu Leu Ile Pro Glu  Pro Glu Lys Gln Arg  Thr Pro Gln
    2210                 2215                 2220

Asp Asn  Gln Leu Thr Tyr Val  Val Ile Ala Ile Leu  Thr Val Val
    2225                 2230                 2235

Ala Ala  Thr Met Ala Asn Glu  Met Gly Phe Leu Glu  Lys Thr Lys
    2240                 2245                 2250

Lys Asp  Leu Gly Leu Gly Ser  Ile Ala Thr Gln Gln  Pro Glu Ser
    2255                 2260                 2265

Asn Ile  Leu Asp Ile Asp Leu  Arg Pro Ala Ser Ala  Trp Thr Leu
    2270                 2275                 2280

Tyr Ala  Val Ala Thr Thr Phe  Val Thr Pro Met Leu  Arg His Ser
    2285                 2290                 2295

Ile Glu  Asn Ser Ser Val Asn  Val Ser Leu Thr Ala  Ile Ala Asn
    2300                 2305                 2310

Gln Ala  Thr Val Leu Met Gly  Leu Gly Lys Gly Trp  Pro Leu Ser
    2315                 2320                 2325

Lys Met  Asp Ile Gly Val Pro  Leu Leu Ala Ile Gly  Cys Tyr Ser
    2330                 2335                 2340
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Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Leu Phe Leu Leu Val
2345                2350                2355

Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
2360                2365                2370

Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
2375                2380                2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
2390                2395                2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
2405                2410                2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
2420                2425                2430

Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
2435                2440                2445

Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
2450                2455                2460

Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
2465                2470                2475

Leu Phe Xaa Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
2480                2485                2490

Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
2495                2500                2505

Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
2510                2515                2520

Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
2525                2530                2535

Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
2540                2545                2550

Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val
2555                2560                2565

Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570                2575                2580

Gly Leu Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly
2585                2590                2595
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Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
2600 2605 2610

Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Ile Pro Pro
2615 2620 2625

Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
2630 2635 2640

Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
2645 2650 2655

Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
2660 2665 2670

Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
2675 2680 2685

Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
2690 2695 2700

Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
2705 2710 2715

Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
2720 2725 2730

Phe Thr Met Arg Tyr Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
2735 2740 2745

Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Ile Pro
2750 2755 2760

Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
2765 2770 2775

His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
2780 2785 2790

Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
2795 2800 2805

Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp
2810 2815 2820

Asp Val Val Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
2825 2830 2835

Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
2840 2845 2850

Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
2855 2860 2865

Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
2870 2875 2880

Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
2885 2890 2895

Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
2900 2905 2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
2915 2920 2925

Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
2930 2935 2940

Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
2945 2950 2955

Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
2960 2965 2970

Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
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Asn Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser
        435                 440                 445

Pro Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp
    450                 455                 460

Cys Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys
465                 470                 475                 480

Met Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
                485                 490                 495

Pro Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn
            500                 505                 510

Tyr Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln
        515                 520                 525

Asp Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu
    530                 535                 540
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Ala Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala
545                 550                 555                 560

Gly His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly
                565                 570                 575

Met Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met
            580                 585                 590

Ala Glu Thr Gln His Gly Thr Thr Val Val Lys Val Lys Tyr Glu Gly
        595                 600                 605

Ala Gly Ala Pro Cys Lys Val Pro Ile Glu Ile Arg Asp Val Asn Lys
    610                 615                 620

Glu Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Leu Ala Glu Asn
625                 630                 635                 640

Thr Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser
                645                 650                 655

Tyr Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe
            660                 665                 670

Arg Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly
        675                 680                 685

Ala Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser
    690                 695                 700

Val Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe
705                 710                 715                 720

Gly Ser Val Tyr Thr Thr Leu Phe Gly Gly Val Ser Trp Met Ile Arg
                725                 730                 735

Ile Leu Ile Gly Phe Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn
            740                 745                 750

Thr Ser Met Ala Met Thr Cys Ile Ala Ala Gly Ile Val Thr Leu Tyr
        755                 760                 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
    770                 775                 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785                 790                 795                 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
                805                 810                 815
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Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Asp Ile Cys Gly Ile
            820                 825                 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
        835                 840                 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
    850                 855                 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865                 870                 875                 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala
                885                 890                 895

Lys Met Leu Ser Thr Glu Ser His Asn Gln Thr Phe Leu Ile Asp Gly
            900                 905                 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
        915                 920                 925

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
    930                 935                 940

Lys Leu Lys Glu Lys Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
945                 950                 955                 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
                965                 970                 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
            980                 985                 990

Ile Glu Val Lys Asn Cys His Trp  Pro Lys Ser His Thr  Leu Trp Ser
        995                 1000                1005

Asn Gly  Val Leu Glu Ser Glu  Met Ile Ile Pro Lys  Asn Leu Ala
    1010                1015                1020

Gly Pro  Val Ser Gln His Asn  Tyr Arg Pro Gly Tyr  His Thr Gln
    1025                1030                1035

Ile Thr  Gly Pro Trp His Leu  Gly Lys Leu Glu Met  Asp Phe Asp
    1040                1045                1050

Phe Cys  Asp Gly Thr Thr Val  Val Val Thr Glu Asp  Cys Gly Asn
    1055                1060                1065

Arg Gly  Pro Ser Leu Arg Thr  Thr Thr Ala Ser Gly  Lys Leu Ile
    1070                1075                1080
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Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
    1085                1090                1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
    1100                1105                1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
    1115                1120                1125

His Gly Gln Val Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
    1130                1135                1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
    1145                1150                1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
    1160                1165                1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
    1175                1180                1185

Ala Thr Met Thr Gly Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
    1190                1195                1200

Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
    1205                1210                1215

Leu Leu Arg Lys Leu Thr Ser Xaa Glu Leu Met Met Thr Thr Ile
    1220                1225                1230

Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
    1235                1240                1245

Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Met
    1250                1255                1260

Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
    1265                1270                1275

Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
    1280                1285                1290

Val Ser Cys Thr Ile Leu Ala Val Val Ser Val Ser Pro Leu Phe
    1295                1300                1305

Leu Thr Ser Ser Gln Gln Lys Thr Asp Trp Ile Pro Leu Ala Leu
    1310                1315                1320

Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
    1325                1330                1335
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Ser Arg  Thr Ser Lys Lys Arg  Ser Trp Pro Leu Asn  Glu Ala Ile
    1340                 1345                 1350

Met Ala  Val Gly Met Val Ser  Ile Leu Ala Ser Ser  Leu Leu Lys
    1355                 1360                 1365

Asn Asp  Ile Pro Met Thr Gly  Pro Leu Val Ala Gly  Gly Leu Leu
    1370                 1375                 1380

Thr Val  Cys Tyr Val Leu Thr  Gly Arg Ser Ala Asp  Leu Glu Leu
    1385                 1390                 1395

Glu Arg  Ala Ala Asp Val Lys  Trp Glu Asp Gln Ala  Glu Ile Ser
    1400                 1405                 1410

Gly Ser  Ser Pro Ile Leu Ser  Ile Thr Ile Ser Glu  Asp Gly Ser
    1415                 1420                 1425

Met Ser  Ile Lys Asn Glu Glu  Glu Glu Gln Thr Leu  Thr Ile Leu
    1430                 1435                 1440

Ile Arg  Thr Gly Leu Leu Val  Ile Ser Gly Leu Phe  Pro Val Ser
    1445                 1450                 1455

Ile Pro  Ile Thr Ala Ala Ala  Trp Tyr Leu Trp Glu  Val Lys Lys
    1460                 1465                 1470

Gln Arg  Ala Gly Val Leu Trp  Asp Val Pro Ser Pro  Pro Pro Met
    1475                 1480                 1485

Gly Lys  Ala Glu Leu Glu Asp  Gly Ala Tyr Arg Ile  Lys Gln Lys
    1490                 1495                 1500

Gly Ile  Leu Gly Tyr Ser Gln  Ile Gly Ala Gly Val  Tyr Lys Glu
    1505                 1510                 1515

Gly Thr  Phe His Thr Met Trp  His Val Thr Arg Gly  Ala Val Leu
    1520                 1525                 1530

Met His  Lys Gly Lys Arg Ile  Glu Pro Ser Trp Ala  Asp Val Lys
    1535                 1540                 1545

Lys Asp  Leu Ile Ser Tyr Gly  Gly Gly Trp Lys Leu  Glu Gly Glu
    1550                 1555                 1560

Trp Lys  Glu Gly Glu Glu Val  Gln Val Leu Ala Leu  Glu Pro Gly
    1565                 1570                 1575

Lys Asn  Pro Arg Ala Val Gln  Thr Lys Pro Gly Leu  Phe Lys Thr
    1580                 1585                 1590
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Asn Ala Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
1595                1600                1605

Thr Ser Gly Ser Pro Ile Ile Asp Lys Lys Gly Lys Val Val Gly
1610                1615                1620

Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
1625                1630                1635

Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
1640                1645                1650

Glu Asp Asp Ile Phe Arg Lys Arg Arg Leu Thr Ile Met Asp Leu
1655                1660                1665

His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
1670                1675                1680

Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
1685                1690                1695

Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
1700                1705                1710

Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Val His Thr Gly
1715                1720                1725

Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
1730                1735                1740

Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
1745                1750                1755

Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
1760                1765                1770

Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
1775                1780                1785

Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
1790                1795                1800

Asn Ala Pro Ile Ile Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
1805                1810                1815

Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
1820                1825                1830

Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
1835                1840                1845
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Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
    1850                1855                1860

Thr Phe Asp Ser Glu Tyr Val Lys Thr Arg Thr Asn Asp Trp Asp
    1865                1870                1875

Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
    1880                1885                1890

Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
    1895                1900                1905

Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
    1910                1915                1920

Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg
    1925                1930                1935

Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
    1940                1945                1950

Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
    1955                1960                1965

Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
    1970                1975                1980

Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
    1985                1990                1995

Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
    2000                2005                2010

Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
    2015                2020                2025

Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
    2030                2035                2040

Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
    2045                2050                2055

Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
    2060                2065                2070

Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
    2075                2080                2085

Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
    2090                2095                2100
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Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Val Arg Asp Ala Leu
2105                2110                2115

Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
2120                2125                2130

Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
2135                2140                2145

Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
2150                2155                2160

Phe Leu Met Ser Ala Arg Gly Ile Gly Lys Met Thr Leu Gly Met
2165                2170                2175

Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
2180                2185                2190

Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
2195                2200                2205

Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
2210                2215                2220

Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
2225                2230                2235

Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
2240                2245                2250

Lys Asp Leu Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
2255                2260                2265

Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
2270                2275                2280

Tyr Ala Val Ala Thr Thr Phe Val Thr Pro Met Leu Arg His Ser
2285                2290                2295

Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
2300                2305                2310

Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
2315                2320                2325

Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
2330                2335                2340

Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Leu Phe Leu Leu Val
2345                2350                2355
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Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
2360 2365 2370

Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
2375 2380 2385

Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
2390 2395 2400

Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
2405 2410 2415

Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
2420 2425 2430

Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
2435 2440 2445

Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
2450 2455 2460

Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
2465 2470 2475

Leu Phe Xaa Ile Met Lys Asn Thr Thr Asn Thr Arg Arg Gly Thr
2480 2485 2490

Gly Asn Ile Gly Glu Thr Leu Gly Glu Lys Trp Lys Ser Arg Leu
2495 2500 2505

Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
2510 2515 2520

Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
2525 2530 2535

Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
2540 2545 2550

Arg Trp Phe Val Glu Arg Asn Met Val Thr Pro Glu Gly Lys Val
2555 2560 2565

Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
2570 2575 2580

Gly Leu Lys Asn Val Arg Glu Val Lys Gly Leu Thr Lys Gly Gly
2585 2590 2595

Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
2600 2605 2610

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Leu Val  Arg Leu Gln Ser Gly  Val Asp Val Phe Phe  Ile Pro Pro
    2615                 2620                 2625

Glu Lys  Cys Asp Thr Leu Leu  Cys Asp Ile Gly Glu  Ser Ser Pro
    2630                 2635                 2640

Asn Pro  Thr Val Glu Ala Gly  Arg Thr Leu Arg Val  Leu Asn Leu
    2645                 2650                 2655

Val Glu  Asn Trp Leu Asn Asn  Asn Thr Gln Phe Cys  Ile Lys Val
    2660                 2665                 2670

Leu Asn  Pro Tyr Met Pro Ser  Val Ile Glu Lys Met  Glu Ala Leu
    2675                 2680                 2685

Gln Arg  Lys Tyr Gly Gly Ala  Leu Val Arg Asn Pro  Leu Ser Arg
    2690                 2695                 2700

Asn Ser  Thr His Glu Met Tyr  Trp Val Ser Asn Ala  Ser Gly Asn
    2705                 2710                 2715

Ile Val  Ser Ser Val Asn Met  Ile Ser Arg Met Leu  Ile Asn Arg
    2720                 2725                 2730

Phe Thr  Met Arg Tyr Lys Lys  Ala Thr Tyr Glu Pro  Asp Val Asp
    2735                 2740                 2745

Leu Gly  Ser Gly Thr Arg Asn  Ile Gly Ile Glu Ser  Glu Ile Pro
    2750                 2755                 2760

Asn Leu  Asp Ile Ile Gly Lys  Arg Ile Glu Lys Ile  Lys Gln Glu
    2765                 2770                 2775

His Glu  Thr Ser Trp His Tyr  Asp Gln Asp His Pro  Tyr Lys Thr
    2780                 2785                 2790

Trp Ala  Tyr His Gly Ser Tyr  Glu Thr Lys Gln Thr  Gly Ser Ala
    2795                 2800                 2805

Ser Ser  Met Val Asn Gly Val  Val Arg Leu Leu Thr  Lys Pro Trp
    2810                 2815                 2820

Asp Val  Val Pro Met Val Thr  Gln Met Ala Met Thr  Asp Thr Thr
    2825                 2830                 2835

Pro Phe  Gly Gln Gln Arg Val  Phe Lys Glu Lys Val  Asp Thr Arg
    2840                 2845                 2850

Thr Gln  Glu Pro Lys Glu Gly  Thr Lys Lys Leu Met  Lys Ile Thr
    2855                 2860                 2865
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Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
2870 2875 2880

Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
2885 2890 2895

Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
2900 2905 2910

Arg Glu Ala Val Glu Asp Ser Arg Phe Trp Glu Leu Val Asp Lys
2915 2920 2925

Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
2930 2935 2940

Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
2945 2950 2955

Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
2960 2965 2970

Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
2975 2980 2985

Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu
2990 2995 3000

His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
3005 3010 3015

Gly Ala Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile
3020 3025 3030

Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
3035 3040 3045

Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
3050 3055 3060

Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
3065 3070 3075

Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
3080 3085 3090

Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
3095 3100 3105

Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
3110 3115 3120

Gln His Leu Thr Ile Thr Glu Glu Ile Ala Val Gln Asn Trp Leu
3125 3130 3135

Ala Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
3140 3145 3150

Asp Asp Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala
3155 3160 3165

Leu Thr Ala Leu Asn Asp Met Gly Lys Ile Arg Lys Asp Ile Gln
3170 3175 3180

Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
3185 3190 3195

Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
3200 3205 3210

Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
3215 3220 3225

Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
3230 3235 3240

Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
3245 3250 3255

His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
3260 3265 3270

Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
3275 3280 3285

His Ala Lys His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
3290 3295 3300

Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
3305 3310 3315

Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
3320 3325 3330

Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala
3335 3340 3345

Thr Trp Ala Lys Asn Ile Gln Ala Ala Ile Asn Gln Val Arg Ser
3350 3355 3360

Leu Ile Gly Asn Glu Glu Tyr Thr Asp Tyr Met Pro Ser Met Lys
3365 3370 3375

Arg Phe Arg Arg Glu Glu Glu Glu Ala Gly Val Leu Trp
3380 3385 3390