

FIG. 1A

P2086 Non-lipidated Variant Nucleic Acid Sequences

>A04 Variant Nucleic Acid Sequence (SEQ ID NO: 1)
 TGCAGCAGCGGAGCGGCGGTGTGCGCGCGACATCGGCACGGGGCTTGCCGATGCACATAACTGCGCCGCTCGACC
 ATAAAGACAAAGGTTTGAAATCCCTGACATTGGAAGACTCCATTCCCAAAACGGAACACTGACCCCTGTGCGCACAAAGGTGC
 GGAAAAAACTTTCAAAGCCGGGACAAAGACAAACAGCCCTCAACACGGGCAAACTGAAGAACGACAAAAATCAGCCGCTTCGAC
 TTCGTGCAAAAAATCGAAGTGGACGGACAAACCATCACACTGGCAAGCGGCGAATTTCAAATATACAAACAGGACCACTCCG
 CCGTCGTTGCCCTACAGATTGAAAAAATCAACAACCCCGACAAAAATCGACAGCCCTGATAAAACCAACGCTCCTTCTTGTCTAG
 CGGTTTGGGCGGAGAACATACCGCCTTCAACCAACTGCCCGGCGACAAAGCCGAGTATCACGGCAAAAGCATTCAGCTCCGAC
 GATGCCGGGAAAACTGACCTATACCATAGATTTTGGCGCCAAACAGGGACACGGCAAAATCGAAACACCTGAAAAACACCCG
 AGCAAAATGTCGAGCTTGCCCGCCGCAACTCAAAGCAGATGAAAAATCACACGCGTCATTTTGGCGACACGCGCTACGG
 CAGCGAAGAAAAAGGCACTTACCACCTCGCCCTTTTCGGCGACCGGCCCAAGAAATCGCCGGCTCGGCAACCCGTGAAGATA
 GGGGAAAAGGTTCACGAAATCGGCATCGCCGGCAACAGTAG

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>A05 Variant Nucleic Acid Sequence (SEQ ID NO: 2)
 TGCAGCAGCGGAAGCGGAGCGGCGGTGTGCGCGCGACATCGGCACAGGGCTTGCCGATGCACATAACTGCGCCGCG
 TCGACCATAAAGACAAAGGTTTGAAATCCCTGACATTGGAAGACTCCATTTCCCAAAACGGAACACTGACCCCTGTGCGCAC
 AGGTGCGGAAAAAATTTCAAAGTGGCGACAAAGACAAACAGTCTCAATACAGGCAAAATGAAGAACGACAAAAATCAGCCGC
 TTCGACTTTGTGCAAAAAATCGAAGTGGACGGACAAACCATCACGCTGGCAAGCGCGAATTTCAAATATACAAACAGGACC
 ACTCCGCGGTCGTTGCCCTACAGATTGAAAAAATCAACAACCCCGACAAAAATCGACAGCCCTGATAAACCAACGCTCTCCT
 TGTACGCGGTTTGGCGGAGAACATACCGCCTTCAACCAACTGCCAGCGGCAAAAGCCGAGTATCACGGCAAAAGCATTCAGC
 TCCGACGATGCCCGGGAAAACTGACCTATACCATAGATTTTGGCGCCAAACAGGGACACGGCAAAATCGAAACACCTGAAAA
 CACCCGAGCAGATGTCGAGCTTGCCCTCCGCGAACTCAAAGCAGATGAAAAATCACACGCGTCATTTTGGCGACACGCG
 CTACGGCAGCGAAGAAAGGCACTTACCACCTCGCTCTTTTCGGCGACCGAGCCCAAGAAATCGCCGGCTCGGCAACCCGTG
 AAGATAAGGGAAAAAGGTTCACGAAATCGGCATCGCCGGCAACAGTAG

FIG. 1B

>A12 Variant Nucleic Acid Sequence (SEQ ID NO: 3)
 TGCAGACGGAGGCGGGTGTGCGCGCGACATCGGCGGGGCTTGCCGATGCACCTAACCGCACCGCTCGACCATAAAG
 ACAAAAAGTTTGCAGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
 AACTTATGGAAACGGCGACAGCCTCAATACGGGCAAAATTGAAGAACGACAAGGTAGCCGCTTCGACTTTATCCGTCAAATC
 GAAGTGGACGGACAACCATCACGCTGGCAAGCGGGAATTTCAAATATACAAACAGAACCACTCCGCCGTCGTTGCCCTAC
 AGATTGAAAAAATCAACAACCCCGACAAAATCGACAGCCTGATAAACCAACGCTCCTTGTCTCAGCGGTTTGGCGGGAGA
 ACATACCGCCTTCAACCAACTGCCGTGACGGCAAAAGCCGAGTATCACGGCAAAAGCATTCAGCTCCGACGACCCGAAACGGCAGG
 CTGCACCTACTCCATTGATTTTACCAAAAAACAGGGTTACGGCAGAAATCGAACACCTGAAAAACGCCGAGCAGAAATGTCGAGC
 TTGCCCTCCGCCGAACCTCAAAGCAGATGAAAAATCACACGCCGTCAATTTGGCGGACACGCGCTACGGCGGCGAAGAAAAAGG
 CACTTACCACCTCGCCCTTTTTCGGCGACCGCGCCCAAGAAATCGCCGGCTCGGCAACCCGTGAAGATAAGGAAAAAGGTTTCAC
 GAAATCGGCATCGCCGGCAACAGTAG

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>A12-2 Variant Nucleic Acid Sequence (SEQ ID NO: 4)
 TGCAGCAGCGAGGGGGGTGTGCGCGCGACATTTGGTGGGGGCTTGCCGATGCACCTAACCGCACCGCTCGACCATAAAG
 ACAAAAAGTTTGCAGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
 AACTTATGGAAACGGCGACAGCCTCAATACGGGCAAAATTGAAGAACGACAAGGTAGCCGCTTCGACTTTATCCGTCAAATC
 GAAGTGGACGGACAACCATCACGCTGGCAAGCGGGAATTTCAAATATACAAACAGAACCACTCCGCCGTCGTTGCCCTAC
 AGATTGAAAAAATCAACAACCCCGACAAAATCGACAGCCTGATAAACCAACGCTCCTTGTCTCAGCGGTTTGGCGGGAGA
 ACATACCGCCTTCAACCAACTGCCGTGACGGCAAAAGCCGAGTATCACGGCAAAAGCATTCAGCTCCGACGACCCGAAACGGCAGG
 CTGCACCTACTCCATTGATTTTACCAAAAAACAGGGTTACGGCAGAAATCGAACACCTGAAAAACGCCGAGCAGAAATGTCGAGC
 TTGCCCTCCGCCGAACCTCAAAGCAGATGAAAAATCACACGCCGTCAATTTGGCGGACACGCGCTACGGCGGCGAAGAAAAAGG
 CACTTACCACCTCGCCCTTTTTCGGCGACCGCGCCCAAGAAATCGCCGGCTCGGCAACCCGTGAAGATAAGGAAAAAGGTTTCAC
 GAAATCGGCATCGCCGGCAACAGTAG

FIG. 1C

>A22 Variant Nucleic Acid Sequence (SEQ ID NO: 5)
 TGCAGCAGCGGAGCGGGTGTGCGCGCGGACATCGGCGCGGGCTTGCCGATGCACATAACCGCACCGCTCGACCATAAAG
 ACAAAAAGTTTGACGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
 AACTTATGGAACCGGCACAGCCTCAATACGGGCAAAATTGAAGAACGACAAGGTAGCCGCTTCGACTTTATCCGTCAAATC
 GAAGTGACGGCAGCTCATTTACCTTGGAGAGCGGAGAGTTCCAAATATACAAACAGGACCACTCCGCCGTCGTTGCCCTAC
 AGATTGAAAAAATCAACAACCCCGACAAAATCGACAGCCTGATAAAACCAACGCTCCTTGTGTAGCGGTTTGGGTGGAGA
 ACATACCGCCTTCAACCAACTGCCCAGCGGCAAAAGCCGAGTATCACGGCAAAAGCATTCAGCTCCGACGATGCTGGCGGAAAA
 CTGACCTATACCATAGATTTGCGCGCAACACAGGACACGCAAAATCGAACACTTGAAAAACACCCGAGCAAAATGTCGAGC
 TTGCCCTCCGCCGAACCTCAAAGCAGATGAAAAATCACACGCCGTCAATTTGGCGGACACGCGCTACGGCGGCAAGAAAAAGG
 CACTTACCACCTCGCCCTTTTCGGCGACCGCGCCCAAGAAATCGCCGGCTCGGCAACCCGTGAAGATAAGGAAAAAGGTTTCAC
 GAAATCGGCATCGCGCGCAACAGTAG

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>B02 Variant Nucleic Acid Sequence (SEQ ID NO: 6)
 TGCAGCAGCGGAGCGGGAAGCGGAGCGCGGTGTGCGCGCGGACATCGGCGCGGGCTTGCCGATGCACATAACCGCAC
 CGCTCGACCATAAAGACAAAGGTTTGAAATCCCTGACATTGGAAGACTCCATTTCCCAAAACGGAACACTGACCCCTGTCCGC
 ACAAGTGCGGAAAGAACTTTCAAAGCCGGGACAAAGACAAACAGTCTCAACACAGGCAAACTGAAGAACGACAAAAATCAGC
 CGCTTCGACTTTATCCGTCAAATCGAAGTGACGGGAGCTCATTTACCTTGGAGAGCGGAGAGTTCCAAGGTACAAACAAA
 GCCATTCCGCCCTTAACCGCCCTTCAGACCGAGCAAGTACAAGACTCGGAGCATTCGGGAAAGATGGTTGCGAAACGCCAGTT
 CAGAAATCGGCGACATAGTGGGCGAACAATACATCTTTTGACAAGCTTCCCAAAAGACGTCAATGCGGACATATCGCGGACGGCG
 TTCGGTTCAGACGATGCCGGCGGAAAACTGACCTACACCATAGATTTGCGCGCCCAAGCAGGACACGCAAAATCGAACATTT
 TGAAATCGCCTGAACCTCAATGTTGACCTGCGCGCCGATATCAAGCCGGATGAAAAACACCATGCGCTCATCAGCGGTTTC
 CGTCCCTTTACAACCAAGCCGAGAAAGGCAGTTACTCTCTAGGCATCTTTTGGCGGGCAAGCCCAAGAAAGTTGCCGGCAGCGCG
 GAAGTGGAACCGCAACGGCATACGCCATATCGGTCTTTGCCCGCAAGCAATAA

FIG. 1D

>B03 Variant Nucleic Acid Sequence (SEQ ID NO: 7)
 TGCAGCAGCGAGGCGGGTGTCCGCCGACATCGCGCGGGCTTGCCGATGCACCTAACCGCACCGCTCGACCATAAAG
 ACAAAAAGTTTGCAGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
 AACTTATGGAAACGGCGACAGCCTTAATACGGGCAAAATTGAAGAACGACAAGGTGAGCCGTTTCGACTTTATCCGTCAAATC
 GAAGTGGACGGCAGCTCATTTACCTTGGAGAGCGGAGAGTTCCAAGTGTAACAACAAAGCCATTCCGCCTTAAACCGCCCTTC
 AGACCGAGCAAGAACAGATCCAGAGCATTCGGGAAAGATGGTTGCGAAACGCCGTTCAAATACTGGCGACATAGCGGGCGA
 ACATACATCTTTTGACAAAGCTTCCCAAGACGTCATGGCGACATATCGCGGGACGGCGTTTCGGTTCAGACGATGCCGGCGGA
 AAAGTACCTATACATATAGATTTTGTGCTGCCAAACAGGGACACGGCAAAATCGAACATTTGAAATCGCCGAACTCAATGTCTG
 AGCTTGCCACCGCCTATATCAAGCCGGATGAAAAACACCATGCGGTCAATCAGCGGTTCCGTCCTTTACAAATCAAGACGAGAA
 AGGCAGTTACTCCCTCGGTATCTTTGGCGGGCAAGCCAGGAAAGTTGCCGGCAGCGGAAAGTGGAAACCCGCAACGGGCATA
 CACCATATCGGTCTTGCCGCCAAGCAATAA

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>B09 Variant Nucleic Acid Sequence (SEQ ID NO: 8)
 TGCAGCAGCGAGGCGGGTGTCCGCCGACATCGGTGCGGGCTTGCCGATGCACCTAACCGCACCGCTCGACCATAAAG
 ACAAGGTTTGCAGTCTTTAACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
 AACTTATGGAAACGGCGACAGCCTTAATACGGGCAAAATTGAAGAACGACAAGGTGAGCCGTTTCGACTTTATCCGTCAAATC
 GAAGTGGACGGGAAGCTCATTTACCTTGGAGAGCGGAGAGTTCCAAGTGTAACAACAAAGCCATTCCGCCTTAAACCGCCCTTC
 AGACCGAGCAAGTACAAGACTCGGAGGATTCGGGAAAGATGGTTGCGAAACGCCAGTTCAGAATCGCGACATAGCGGGCGA
 ACATACATCTTTTGACAAAGCTTCCCAAGCGGCAGTGCGACATATCGCGGGACGGCGTTTCGGTTCAGACGATGCTGGCGGA
 AAAGTACCTATACATATAGATTTGCGCGCCCAAGCAGGGACACGGCAAAATCGAACATTTGAAATCGCCGAACTCAATGTCTG
 AGCTTGCCACCGCCTATATCAAGCCGGATGAAAAACGCCATGCGGTATCAGCGGTTCCGTCCTTTACAAACCAAGACGAGAA
 AGGCAGTTACTCCCTCGGTATCTTTGGCGGGCAAGCCAGGAAAGTTGCCGGCAGCGGAAAGTGGAAACCCGCAACGGGCATA
 CACCATATCGGTCTTGCCGCCAAGCAGTAA

FIG. 1E

>B22 Variant Nucleic Acid Sequence (SEQ ID NO: 9)
 TGCAGCAGCGAGCGGGTGTGTCGCCGCCGACATCGCGCGGTGCTTGCCGATGCACCTAACCGCACCGCTCGACCATAAAG
 ACAAAAAGTTTGACGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAAGTGCGGAAAA
 AACTTATGGAAACGGCGACAGCCTCAATACGGGCAAAATTGAAGAACGACAAGGTGAGCCGCTTCGACTTTTATCCGTCAAATC
 GAAGTGGACGGGCAGCTCATTTACCTTGGAGAGCGGAGAGTTCCAAGTGTAACAACAAAGCCATTCCGCCTTAAACCGCCCTTC
 AGACCGAGCAAAGTACAAGATTCCGGAGCATTCAGGGAAGATGGTTGCGAAACGCCAGTTCAGAATCGCGGATATAGCGGGTGA
 ACATACATCTTTTGACAAAGCTTCCCGAAGCGCGGACGGCGACATATCGCGGGACGGCATTCGGTTCAGACGATGCCAGTGGA
 AAAGTACCTACACCATAGATTTCGCCGCCAAGCAGGACACGGCAAAATCGAACATTTGAAATCGCCAGAACTCAATGTTG
 ACCTGGCCGCTCCGATATCAAGCCGGATAAAAAACGCCATGCCGTGTCATCAGCGGTTCCGTCCTTTACAAACCAAGCCGAGAA
 AGGCAGTTACTCTCTAGGCATCTTTGGCGGGCAAGCCAGGAAAGTTGCCGGCAGCGCAGAAAGTGGAACCCGCAACGGGCATA
 CGCCATATCGGTCTTGCCGCCAAGCAGTAA

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>B24 Variant Nucleic Acid Sequence (SEQ ID NO: 10)
 TGCAGCAGCGAGGGGTGGTGTGTCGCCGCCGACATCGGTGCGGGGCTTGCCGATGCACCTAACCGCACCGCTCGACCATAAAG
 ACAAGGTTTGACGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAAGTGCGGAAAA
 AACTTATGGAAACGGTGACAGCCTCAATACGGGCAAAATTGAAGAACGACAAGGTGAGCCGTTTCGACTTTTATCCGCCAAATC
 GAAGTGGACGGGCAGCTCATTTACCTTGGAGAGTGGAGAGTTCCAAGTATACAAACAAAGCCATTCCGCCTTAAACCGCCCTTC
 AGACCGAGCAAATACAAGATTCCGGAGCATTCGGGAAGATGGTTGCGAAACGCCAGTTCAGAATCGCGGACATAGCGGGCGA
 ACATACATCTTTTGACAAAGCTTCCCGAAGCGCGGACGGCGACATATCGCGGGACGGCGTTCCGGTTCAGACGATGCCGGCGGA
 AAAGTACCTACACCATAGATTTCGCCGCCAAGCAGGGAACGGCAAAATCGAACATTTGAAATCGCCAGAACTCAATGTCG
 ACCTGGCCGCGCGGATATCAAGCCGGATGAAAACGCCATGCCGTGTCATCAGCGGTTCCGTCCTTTACAAACCAAGCCGAGAA
 AGGCAGTTACTCCCTCGGTATCTTTGGCGGAAAAAGCCAGGAAAGTTGCCGGCAGCGCGGAAAGTGAAAAACCGTAAACGGGCATA
 CGCCATATCGGCCTTGCCGCCAAGCAATAA

FIG. 1F

>B44 Variant Nucleic Acid Sequence (SEQ ID NO: 11)
TGCAGCAGCGGAGCGGGAAGCGGAGCGGGGTGTGCGCGCCGACATCGGCGGGGGCTTGCCGATGCACATAACCGCAC
CGCTCGACCATAAAGACAAAGGTTTGAAATCCCTGACATTGGAAGACTCCATTTCCCAAAACGGAACACTGACCCGTGTCGGC
ACAAGGTGCGGAAAGAACTTTCAAAGCCGGCGACAAAGACAACAGTCTCAACACAGGCAAACTGAAGAACGACAAAAATCAGC
CGCTTCGACTTTATCCGTCAAATCGAAGTGGACGGGAGCTCATTAACCTTGAGAGCGGAGAGTTCCAAAGTGTACAAACAAA
GCCATTCGGCCTTAACCGCCCTTCAGACCGAGCAAGTACAAGACTCGGAGCATTCGGGAAAGATGGTTGCCGAAACGCCAGTT
CAGAAATCGGCGACATAGTGGGCGAACAATACATCTTTTGGCAAGCTTCCCAAAAGACGTCAATGGCGACATATCGCGGGACGGCG
TTCGGTTCAGACGATGCCGGCGGAAACTGACCTACACATAGATTTCGCCGCCAAGCAGGACACGGCAAAATCGAACATT
TGAAATCGCCAGAACTCAATGTTGACCTGGCCGCCGATATCAAGCCGGATGAAAAACACCATGCCGTCAATCAGCGGTTTC
CGTCCCTTTACAACCAAGCCGAGAAAGGCAGTTACTCTCTAGGCATCTTTGGCGGGCAAGCCCAAGGAAAGTTGCCGGCAGCGCG
GAAGTGGAACCGCAACGGCATACGCCATATCGGTCTTGCCGCCAAGCAATAA

FIG. 2A

P2086 Non-lipidated Variant Amino Acid Sequences

>A04 Variant Amino Acid Sequence (SEQ ID NO: 12)
 CSSGGGGGVAADIGTGLADALTAPLDHKDKGLKSLTLEDSIPQNGTILTLAQGAETTFKAGDKDNLNTGKLKNDKISRFD
FVQKIEVDGQTITLASGEFQIYKQDHSAVVALQIEKINNPDKIDSLINQRSFLVSGLGEHTAFNQLPGDKAEYHGKAFSSD
 DAGGKLTYTIDFAAKQGHGKIEHLKTPEQNVELAAAEKKADEKSHAVILGDTRYGSEEKGTYHLALFGDRAQEIAGSATVKI
 GEKVHEIGIAGKQ

>A05 Variant Amino Acid Sequence (SEQ ID NO: 13)
 CSSGSGSGGGVAADIGTGLADALTAPLDHKDKGLKSLTLEDSISQNGTILTLAQGAETTFKVGDKDNSLNTGKLKNDKISR
FDFVQKIEVDGQTITLASGEFQIYKQDHSAVVALQIEKINNPDKIDSLINQRSFLVSGLGEHTAFNQLPSGKAEYHGKAFS
 SDDAGGKLTYTIDFAAKQGHGKIEHLKTPEQNVELASAEKKADEKSHAVILGDTRYGSEEKGTYHLALFGDRAQEIAGSATV
 KIREKVHEIGIAGKQ

>A12 Variant Amino Acid Sequence (SEQ ID NO: 14)
 CSSGGGGVAAADIGAGLADALTAPLDHKDKSLQSLTLDQSVRKNEKCLKAAQGAETTYGNGDSLNTGKLKNDKVSFRDFIRQI
EVDGQTITLASGEFQIYKQNHSAVVALQIEKINNPDKIDSLINQRSFLVSGLGEHTAFNQLPDGKAEYHGKAFSSDDPNGR
 LHYSIDFTKKQGYGRIEHLKTPEQNVELASAEKKADEKSHAVILGDTRYGGEKGTYHLALFGDRAQEIAGSATVKIREKVH
 EIGIAGKQ

>A22 Variant Amino Acid Sequence (SEQ ID NO: 15)
 CSSGGGGVAAADIGAGLADALTAPLDHKDKSLQSLTLDQSVRKNEKCLKAAQGAETTYGNGDSLNTGKLKNDKVSFRDFIRQI
EVDGQLITLESGEFQIYKQDHSAVVALQIEKINNPDKIDSLINQRSFLVSGLGEHTAFNQLPSGKAEYHGKAFSSDDAGGK
 LTYTIDFAAKQGHGKIEHLKTPEQNVELASAEKKADEKSHAVILGDTRYGGEKGTYHLALFGDRAQEIAGSATVKIREKVH
 EIGIAGKQ

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FIG. 2B

>B02 Variant Amino Acid Sequence (SEQ ID NO: 16)
 CSSGGGGGVAADIGAGLADALTAPLDHKDKGLSLTLEDSISQNGTLTLSAQGAERTFKAGDKDNLNTGKLKNDKIS
 RFDFIQIEVDGQLITLESGEFQVYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIVGEHTSFDKLPKDVMATYRGTA
 FGSDDAGGKLTYYTIDFAAKQGHGKIEHLKSPELNVDLAAADIKPDEKHHAVISGSVLYNQAEKGSYSLSGIFGGQAEVAGSA
 EVETANGIRHIGLAAKQ

>B03 Variant Amino Acid Sequence (SEQ ID NO: 17)
 CSSGGGGVAAADIGAGLADALTAPLDHKDKSLQSLTLDQSVRKNEKLKLAQAQGAETTYGNGDSLNTGKLKNDKVSRRFDFIRQI
 EVDGQLITLESGEFQVYKQSHSALTALQTEQEQQDPEHSGKMVAKRRFKIGDIAGEHTSFDKLPKDVMATYRGTAFGSDDAGG
 KLTYYTIDFAAKQGHGKIEHLKSPELNVELATAYIKPDEKHHAVISGSVLYNQDEKGSYSLSGIFGGQAEVAGSAEVEETANGI
 HHIGLAAKQ

>B09 Variant Amino Acid Sequence (SEQ ID NO: 18)
 CSSGGGGVAAADIGAGLADALTAPLDHKDKGLQSLTLDQSVRKNEKLKLAQAQGAETTYGNGDSLNTGKLKNDKVSRRFDFIRQI
 EVDGKLITLESGEFQVYKQSHSALTALQTEQVQDSEDSGKMVAKRQFRIGDIAGEHTSFDKLPKGSATYRGTAFGSDDAGG
 KLTYYTIDFAAKQGHGKIEHLKSPELNVELATAYIKPDEKRRHAVISGSVLYNQDEKGSYSLSGIFGGQAEVAGSAEVEETANGI
 HHIGLAAKQ

>B22 Variant Amino Acid Sequence (SEQ ID NO: 19)
 CSSGGGGVAAADIGAVLADALTAPLDHKDKSLQSLTLDQSVRKNEKLKLAQAQGAETTYGNGDSLNTGKLKNDKVSRRFDFIRQI
 EVDGQLITLESGEFQVYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIAGEHTSFDKLPPEGGRATYRGTAFGSDDASG
 KLTYYTIDFAAKQGHGKIEHLKSPELNVDLAAADIKPDKRRHAVISGSVLYNQAEKGSYSLSGIFGGQAEVAGSAEVEETANGI
 RHIGLAAKQ

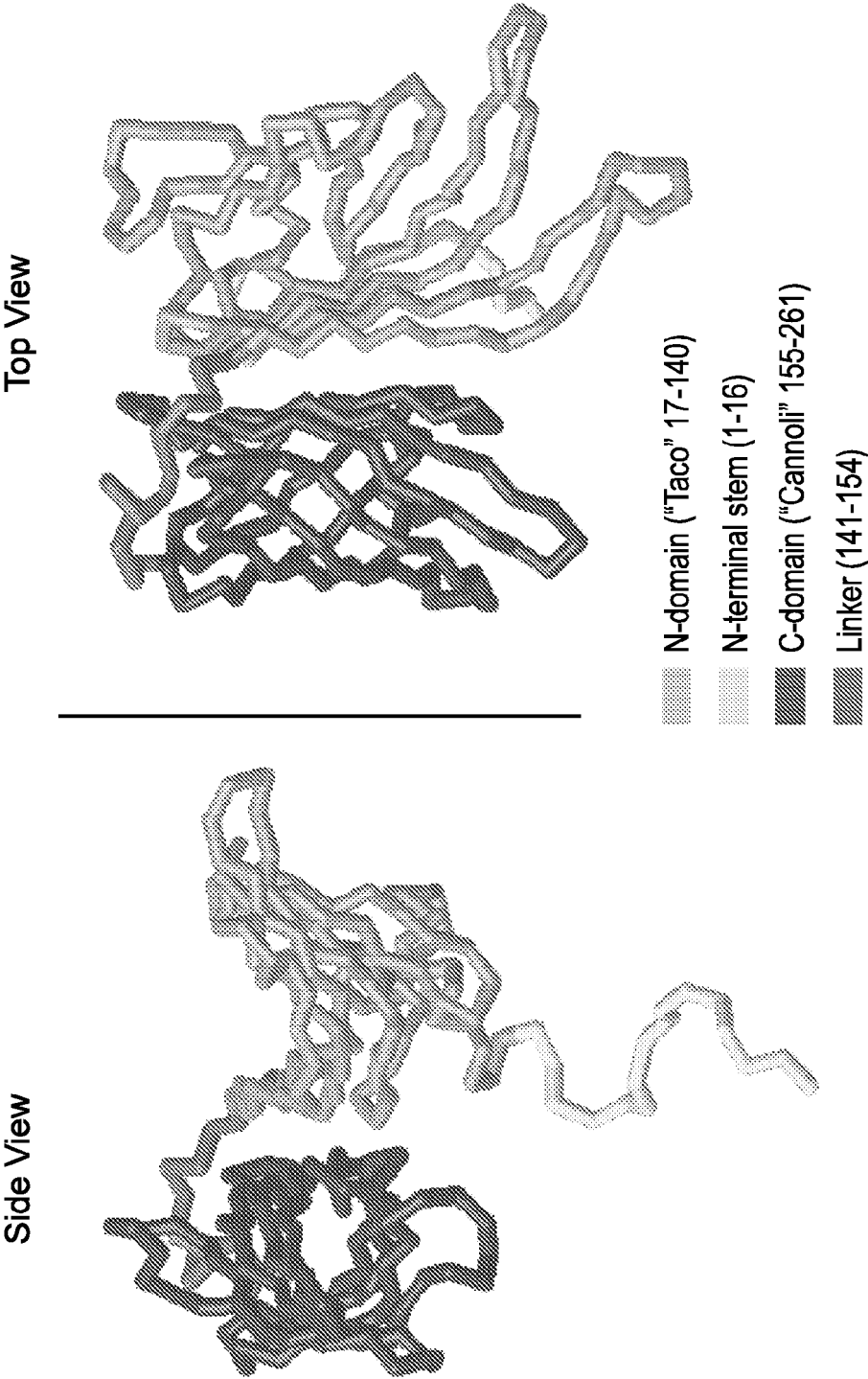
FIG. 2C

>B24 Variant Amino Acid Sequence (SEQ ID NO: 20)
CSSGGGVAADIGAGLADALTAPLDHKDKGLQSLTLDQSVRKNEKLLAAQGAEKTYNGDSLNTGKLKNDKVSRRFDFIRQI
EVDGQLITLESGEFQVYKQSHSALTAFQTEQIQDSEHSGKMVAKRQFRIGDIAGEHTSFDKLP EGGRATYRGTAFGSDDAGG
KLTYTIDFAAKQGNQKIEHLKSPELNVDLAAADIKPDGKRHAVISGSVLYNQAEKGSYSLSGIFGGKAQEVAGSAEVTVNGI
RHIGLAAKQ

>B44 Variant Amino Acid Sequence (SEQ ID NO: 21)
CSSGGGGGVAADIGAGLADALTAPLDHKDKGLKSLTLEDSSISQNGTTLTSAQGAERTFKAGDKDNSLNTGKLKNDKIS
RFD FIRQIEVDGQLITLESGEFQVYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIVGEHTSFGKLPKDVMTYRGTA
FGSDDAGGKLTYYTIDFAAKQGHGKIEHLKSPELNVDLAAADIKPDEKHHAVISGSVLYNQAEKGSYSLSGIFGGQAQEVAGSA
EVTANGIRHIGLAAKQ

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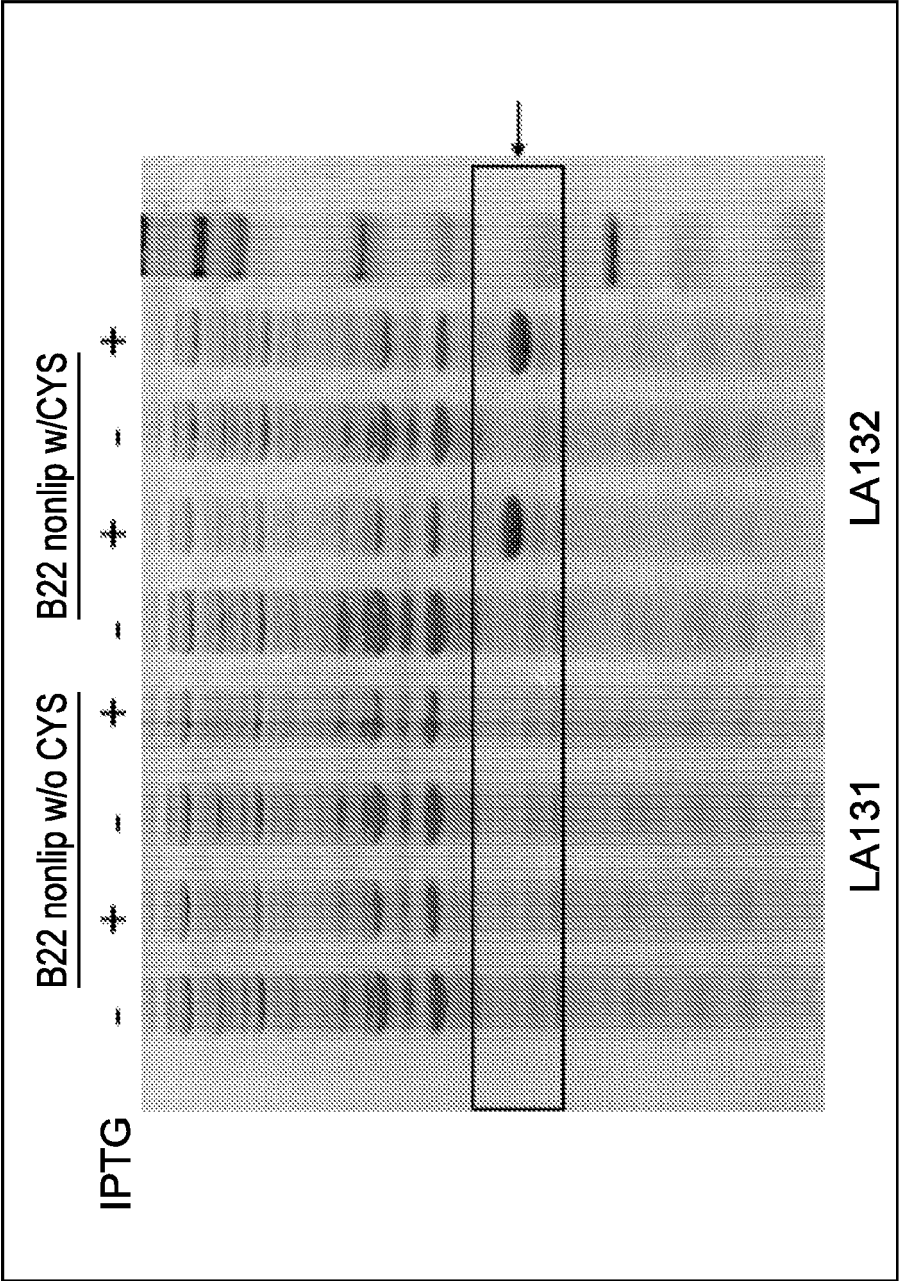
FIG. 3



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FIG. 4

Removal of N-terminal Cys Results in Loss of Expression in *E. coli*



Similar results were obtained for the CYS-minus A22 construct.

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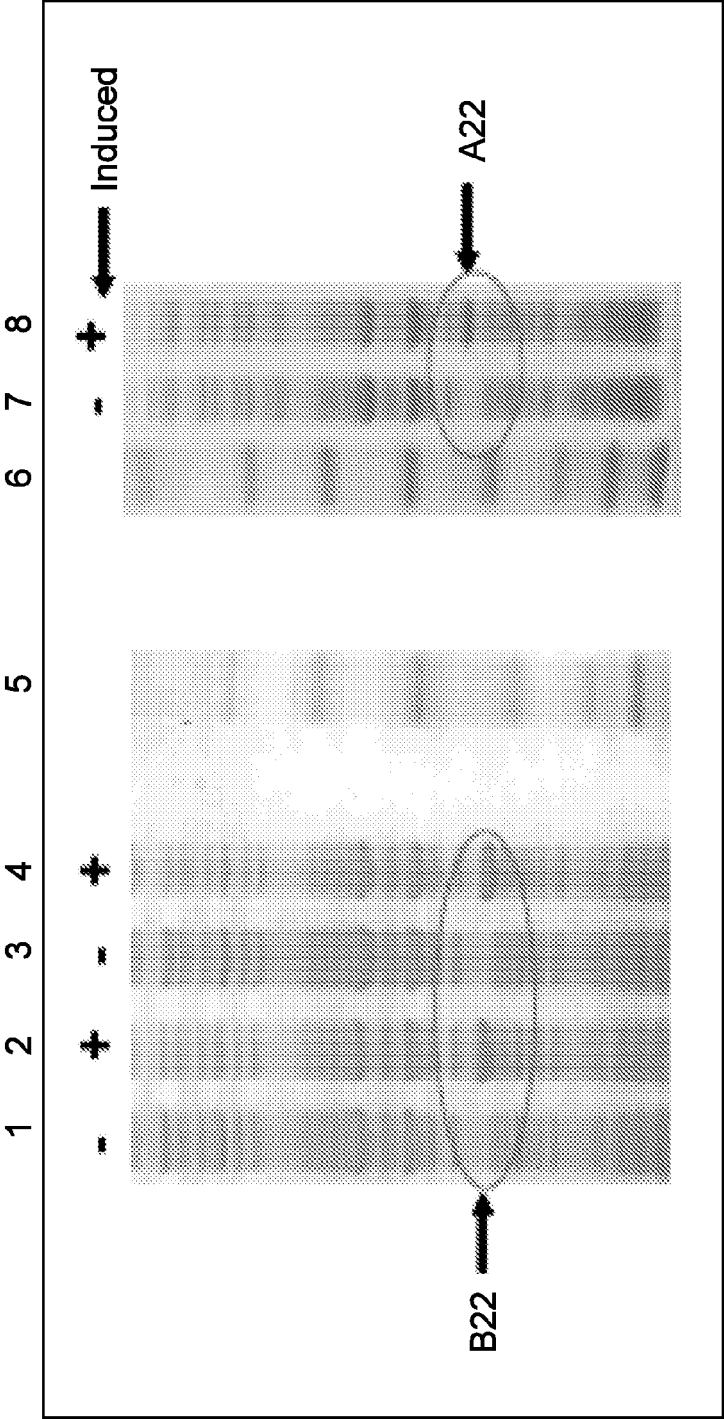
FIG. 5**Effect of Gly/Ser Stalk Length on Non-lipidated ORF2086 Variant Expression**

Protein Variant	Coomassie Expression w/o N-term Cys	Extra Gly/Ser?
B01 CSSGGGSGGGVTADIGTGLADALTAP	Yes	Yes (+5)
B44 CSSGGGSGGGVAAADIGAGLADALTAP	Yes	Yes (+5)
A05 CSSGGGSGGGVAAADIGTGLADALTAP	Yes	Yes (+4)
A22 CSSGGGVAADIGAGLADALTAP	No*	No
B22 CSSGGGVAADIGAVLADALTAP	No*	No
A19 CSSGGGVAADIGAGLADALTAP	No*	No

*Yes if add back N-term Cys

FIG. 7

Codon Optimization Increases Expression of Non-lipidated B22 and A22 Variants



N-terminal B09 Gly codon changes applied to B22 and A22

FIG. 8A

> SEQ ID NO: 43

AGCTCTGGAGGTGGAGGAAGCGGGGGGGTGGAGTTGCAGCAGACATTGGAGCAGGATTAGCAGATGCACCTGACGGCACCGT
TGGATCATAAAGACAAAGGCTTGAAATCGCTTACCTTAGAAGATTCTATTTACAAAAATGGCACCTTACCTTGTCCGGCGCA
AGCGCTGAACGTACTTTTAAAGCCGGTGACAAAGATAATAGCTTAAATACAGGTAAACTCAAAAATGATAAAAATCTCGCGT
TTTGATTTTCATTCTGTCAAATCGAAGTAGATGGCCAACTTATTACATTAGAAAAGCGGTGAATCCCAAGTATATAACAATCCC
ATTACAGCACTTACAGCATTGCAAAACCGAACAGGTCCAAAGACTCAGAACATTCCGGCAAAAATGGTAGCTAAACGTCAATTCCG
CATCGGTGACATTGTCGGTGAACATACAAAGCTTCGGAAAAATTACCAAAAAGATGTGATGGCGACCTATCGCGGTACGGCATTT
GGATCAGATGATGCAGGCGGTAAATTAACTTATACAAATTGACTTTGCAGCAAAAACAAGGACATGGCAAAAATTGAACATTTAA
AATCTCCCGAACTTAACGTAGATCTCGCAGCAGCAGATATAAAACCAGATGAAAAACACCCACGAGTCATTTCAGGTTCAGT
TTTATACAATCAGGCAGAAAAAGGTTTCGTACTCTTTAGGTATTTTGGCGGGCAAGCTCAAGAAAGTTGCAGGTAGCGCAGAA
GTAGAAACGGCAAAATGGCATTCGTCACATTGGGTTAGCGGCAACAATAA

> SEQ ID NO: 44

SSGGGSGGGGVAADIGAGLADALTAPLDHKDKGLKSLTLEDSISQNGTTLTSAQGAERTFKAGDKDNSLNTGKLKNDKISR
FDFIRQIEVDGQLITLESGEFQYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIVGEHTSFGKLPKDVMTYRGTA
GSDDAGGKLTYYTIDFAAKQGHGKIEHLKSPELNVDLAAADIKPDEKHHAVISGSVLYNQAEKGSYSLGIFGGQAQEVAGSAE
VETANGIRHIGLAAKQ.

FIG. 8B**> SEQ ID NO: 51**

AGCAGCGGAGCGCGGAAGCGGAGCGCGGGTGTCCGCCCGGACATCGGCGCGGGGCTTGCCGATGCACATAACCGCACCGC
 TCGACCATAAAGACAAAGTTTGAAATCCCTGACATTGGAAGACTCCATTTCCCAAAACGGAACACTGACCTGTGCGCACACA
 AGGTGCGGAAAGAACTTCAAAAGCGCGACAAAGACAACAGTCTCAACACAGGCAAACTGAAGAACGACAAAATCAGCCGC
 TTCGACTTTATCCGTCAAATCGAAGTGGACGGGAGCTCATTAACCTTGAGAGCGGAGAGTTCCAAGTGTACAACAAGCC
 ATTCCGCCCTTAACCGCCCTTCAGACCGAGCAAGTACAAGACTCGGAGCATTCGCGGAAGATGGTTGCCGAAACGCCAGTTTCAG
 AATCGCGACATAGTGGCGAACATACATCTTTTGGCAAGCTTCCCAAAGACGTCAATGGCGACATATCGCGGACGCGCTTC
 GGTTCAGACGATGCCGGCGGAAACTGACCTACACCATAGATTTCGCCGCCAAGCAGGACACGGCAAAATCGAACATTTGA
 AATCGCCAGAACTCAATGTTGACCTGGCCGCCCGGATATCAAGCCGGATGAAAAACACCATGCCGTTCATCAGCGGTTCCGT
 CCTTTACAACCAAGCCGAGAAAGGCAGTTACTCTCTAGGCATCTTTGGCGGGCAAGCCAGGAAAGTTGCCGGCAGCGCGGAA
 GTGGAACCGCAACGGCATACGCCATATCGGTCTTTGCCGCCAAGCAATAA

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> SEQ ID NO: 45

AGCTCTGGAGGTGGAGGAAGCGGGGCGGTGGAGTTGCAGCAGACATTTGAGCAGGATTAGCAGATGCACGTGACGGCACCGT
 TGGATCATAAAGACAAAGGCTTGCAAGTCGCTTACCTTAGATCAGTCTGTGTCAGGAAAAATGAGAAACTTAAAGTTGGCGCGCA
 AGCGCTGAAAAAACTTATGGAAAACGGTGACAGCTTAAATACAGGTAAACTCAAAAATGATAAAAGTCTCGCGTTTGTATTC
 ATTCTCAAATCGAAGTAGATGGCAAGCTTATTACATTAGAAAAGCGGTGAATTCCAAGTATATAAACAAATCCCATTCAGCAC
 TTACAGCATTGCAAAACCGAACAGGTCCAAGACTCAGAAGATTCCGGCAAAATGGTAGCTAAACGTCAATTCCGCATCGGTGA
 CATTCGGGTGAACATACAAGCTTCGACAAAATTACCAAAAGCGGCGAGTCGACCTATCGCGGTACGGCATTTGGATCAGAT
 GATGCAAGCGGTAAATTAACTTATACAATTGACTTTGCAGCAAAACAAGGACATGGCAAAATTTGAACATTTAAAATCTCCCG
 AACTTAACGTAGAGCTCGCAACCGCATATATTAAACCAGATGAAAAACGCCACGCAGTCAATTCAGGTTTCAGTTTATACAA
 TCAGGACGAAAAAGGTTCTGTAATCTTTAGGTAATTTTGGCGGGCAAGCTCAAGAAAGTTGCAGGTAGCGCAGAAAGTAGAAACG
 GCAATGGCATTCACCACATTGGGTAGCGCGAAACAATAA

FIG. 8C

>SEQ ID NO: 50

SSGGGSGGGVAAADIGAGLADALTAPLDHKDKGLQLSLTDQSVRKNEKLKLAQAQAEKTYGNGDSLNTGKLKNDKVSREF
FIRQIEVDGKLITLESGEFQYKQSHSALTALQTEQVQDSEDSGKMVAKRQFRIGDIAGEHTSFDKLPKGGSATYRGTAFG
SDDAGGKLTYTIDFAAKQGHGKIEHLKSPELNVELATAYIKPDEKRHAVISGSVLYNQDEKGSYSLGIFGGQAQEVAGSAE
VETANGIHHIGLAAKQ

> SEQ ID NO: 46

AGCTCTGGAGGTGGAGGAGTTGCAGCAGACATTGGAGCAGGATTAGCAGATGCACGTGACGGCACCGTTGGATCATAAAGAC
AAAGGCTTGCAGTCGCTTACCTTAGATCAGTCTGTCAAGGAAAAATGAGAAACTTAAGTTGGCGGCGCAAGCGCTGAAAAA
ACTTATGGAAACGGTGACAGCTTAAATACAGGTAAACTCAAAAATGATAAAGTCTCGCGTTTGTGATTTCAATTCGTCAAATC
GAAGTAGATGGCAAGCTTATTACATTAGAAAAGCGGTGAATCCAAGTATATAAACAAATCCCATTCAGCACCTTACAGCATTTG
CAAAACCGAACAGGTCCAAAGACTCAGAAAGATTCCGGCAAAAATGGTAGCTAAACGTCAATTCGCGCATCGGTGACATTTGCGGGT
GAACATACAAGCTTCGACAAAATTACCAAAAAGCGGCAGTGGACCTATCGCGGTACGGCATTTGGATCAGATGATGCAGGC
GGTAAATTAACTTATACAATTGACTTTGCAGCAAAACAAGGACATGGCAAAATTGAACATTTAAAAATCTCCGAACTTAAC
GTAGAGCTCGCAACCGCATATATTAAACCATGAAAAACGCCACGCAGTCAATTCAGGTTCAAGTTTTATACAAATCAGGAC
GAAAAAGGTTTCGTACTCTTTAGGTAATTTTGGCGGGCAAGCTCAAGAAGTTGCAGGTAGCGCAGAAAGTAGAAAAACGGCAAAAT
GGCATTCACCACATTGGGTAGCGGCGAAACAATAA

FIG. 8D**>SEQ ID NO: 47**

AGCAGCGGGGGGGTGGAGTTGCAGCAGACATTTGGAGCAGGATTAGCAGATGCACCTGACGGCACCGTTGGATCATAAAGACA
 AAGGCTTGCAGTCGCTTACCTTAGATCAGTCTGTCAAGAAAAATGAGAAACTTAAAGTTGGCGGCGCAAGGCGCTGAAAAAAC
 TTATGGAAACGGTGACAGCTTAAATACAGGTAACCTCAAAAAATGATAAAGTCTCGCGTTTGGATTTCATTCGTCAAATCGAA
 GTAGATGGCAAGCTTATTACATTAGAAAAGCGGTGAATTCCAAGTATATAAACAAATCCCATTCAGCACCTTACAGCATTCGCAAA
 CCGAACAGGTCCTCAAGACTCAGAAAGATTCCGGCAAAATGGTAGCTAAACGTCAATTCCGCATCGGTGACATTCGCGGTGAACA
 TACAAGCTTCGACAAATTACCAAAAGCGGCAGTCGACCTATCGCGGTACGGCATTTGGATCAGATGATGCAGGCGGTAAA
 TTAACCTTATACAAATTGACTTTGCAGCAAAACAAAGGACATGGCAAAATTGAACATTTAAAAATCTCCCGAACTTAACGTAGAGC
 TCGCAACCGCATATATTAAACCAGATGAAAAACGCCACGCAGTCA TTTCAAGTTTCAGTTTATACAATCAGGACGAAAAAGG
 TTTCGTACTCTTTAGGTATTTTGGCGGGCAAGCTCAAGAAAGTTGCAGGTAGCGCAGAAAGTAGAAACGGCAAAATGGCATTCAC
 CACATTGGGTTAGCGGCGAAACAATAA

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>SEQ ID NO: 48

AGCAGCGGAGGGGGGGTGTGCGCCGCCGACATCGGTGCGGGGCTTGCCGATGCACATAACCGCACCGCTCGACCCATAAAGACA
 AAGGTTTGCAGTCTTTAAACACTGGATCAGTCCGTCAAGAAAAACGAGAAACTGAAGCTGGCGGCACAAAGGTGCGGAAAAAAC
 TTATGGAAACGGCGACAGCCTTAATACGGGCAAAATTGAAGAACGACAAGGTACGCCGCTTCGACTTTATCCGTCAAATCGAA
 GTGGACGGGAAGCTCATTTACCTTTGGAGAGCGGAGAGTTCCAAGTGTACAAACAAAGCCATTCCGCCCTTAAACCGCCCTTCAGA
 CCGAGCAAGTACAAGACTCGGAGGATTCCGGGAAGATGGTTGCGAAACGCCAGTTCAGAAATCGGCGACATAGCGGGCGAAACA
 TACATCTTTTGACAAAGCTTCCCAAAGCGGCAGTCGACATATCGCGGACGGCGTTCGGTTCAGACGATGCTGGCGGAAAA
 CTGACCTATACTATAGATTTGCGCCGCCAAGCAGGGACACGGCAAAATCGAACATTTGAAATCGCCCGAACTCAATGTCGAGC
 TTGCCACCGCCCTATATCAAGCCGGATGAAAAACGCCATGCCGTTATCAGCGGTTCCGTCCCTTTACAACCAAGACGAGAAAGG
 CAGTTACTCCCTCGGTATCTTTGGCGGGCAAGCCAGGAAAGTTGCCGGCAGCGGGAAGTGGAACCGCAACCGCATACAC
 CATATCGGCTCTTGCCCGCCCAAGCAGTAA

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FIG. 8E**>SEQ ID NO: 49**

SSGGGVAADIGAGLADALTAPLDHKDKGLQSLTLDQSVRKNEKLKLAQAQAEKTYGNGLSLNTGKLNKNDKVSFRDFIRQIE
 VDGLITLESGEFQYKQSHSALTALQTEQVQDSEDSGKMVAKRQFRIGDIAGEHTSFDKLPKGGSATYRGTAFGSD
 DAGGKLTYTIDFAAKQGHGKIEHLKSPELNVELATAYIKPDEKRHAVISGSVLYNQDEKGSYSLGIFGGQAQEVAGSAEVEVET
 ANGIHHIGLAAKQ

>SEQ ID NO: 54

AGCAGCGGAAGCGGAAGCGGAGCGGGGGTGTGCGCGCCGACATCGGCACAGGGCTTGCCGATGCACATAACTGCGCCGCTCG
 ACCATAAAGACAAAGGTTTGAAATCCCTGACATTGGAAGACTCCATTTCCTCAAAACGGAACACTGACCCCTGTGCGGCACAAGG
 TGCAGAAAACCTTTCAAAGTCGGCGACAAAAGACAAACAGTCTCAATACAGGCAAAATTGAAGAACGACAAAATCAGCCGCTTC
 GACTTTGTGCAAAAATCGAAGTGGACGGACAAACCATCACGCTGGCAAGCGCGGAAATTCAAATATACAAACAGGACCACCT
 CCGCCGTCGTTGCCCTACAGATTGAAAAAATCAACAACCCCGACAAAATCGACAGCCTGATAAAACCAACGCTCCTTCCTTGT
 CAGCGGTTTGGCGGAGAACATACCGCCTTCAACCAACTGCCAGCGCAAAAGCCGAGTATCACGGCAAAAGCATTCAGCTCC
 GACGATGCCGGGGAAAACTGACCTATACCATAGATTTTGCCGCCAAACAGGGACACGGCAAAATCGAAACACCTGAAAAACAC
 CCGAGCAGAAATGTCGAGCTTGCCCTCCGCCGAACTCAAAGCAGATGAAAAATCACACGCCGTCAATTTGGGCGACACGCGCTA
 CGGCAGCGAAGAAAAGGCACCTTACCACCTCGCTCTTTTCGGCGACCGAGCCCAAGAAATCGCCGGCTCGGCAACCCGTGAAG
 ATAAGGGAAGGTTTCACGAAATCGGCATCGCCGGCAACAGTAG

>SEQ ID NO: 55

SSGSGGGGVAADIGTGLADALTAPLDHKDKGLKSLTLEDSISQNGTLTLSAQGAETFKVGDKDNSLNTGKLNKNDKISR
 DQVQKIEVDGQTTITLASGEFFQYKQDHSVAVVALQIEKINNPDKIDSLINQRSFLVSLGGEHTAFNQLPSGKAEYHGKAFSS
 DDAGGKLTYTIDFAAKQGHGKIEHLKTPQNVELASAEELKADEKSHAVILGDTTRYGSEEKGTYYHLALFGDRAQEIAGSATVK
 IREKVHEIGIAGKQ.

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FIG. 8F

> SEQ ID NO: 57

SSGGSGGGGTADIGTGLADALTAPLDHKDKGLSLTLEDSISQNGTLTLSAQGAEKTYGNGDSLNTGKLNKDKVSRFDF
IRQIEVDGQLITLESGEFQYKQSHSALTALQTEQEQDPEHSEKMWAKRRFRIGDIAGEHTSFDKLPKDVMATYRGTAFGSD
DAGGKLTYTIDFAAKQGHGKIEHLKSPELNVDLAVAYIKPDEKHHAVISGSVLYNQDEKGSYSLGIFGEKAQEVAGSAEVE
ANGIHHIGLAAKQ

> GenBank AY330406 (SEQ ID NO: 58)

CSSGGSGGGGTADIGTGLADALTAPLDHKDKGLSLTLEDSISQNGTLTLSAQGAEKTYGNGDSLNTGKLNKDKVSRFD
FIRQIEVDGQLITLESGEFQYKQSHSALTALQTEQEQDPEHSEKMWAKRRFRIGDIAGEHTSFDKLPKDVMATYRGTAFGS
DDAGGKLTYTIDFAAKQGHGKIEHLKSPELNVDLAVAYIKPDEKHHAVISGSVLYNQDEKGSYSLGIFGEKAQEVAGSAEVE
TANGIHHIGLAAKQ

>GenBank FJ184191 (SEQ ID NO: 59)

CSSGGGGAADIGAGLADALTAPLDHKDKGLQLLDQSVRKNEKLKLAQAQGAEKTYGNGDSLNTGKLNKDKVSRFDFIRQI
EVDGQLITLESGEFQYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIAGEHTSFDKLPKGGRATYRGTAFSDDAGG
KLIYTIIDFAAKQGHGKIEHLKSPELNVDLAAADIKPDEKHHAVISGSVLYNQAEKGSYSLGIFGGKAQEVAGSAEVKTVNGI
RHIGLAAKQ

> GenBank AY330385 (SEQ ID NO: 60)

CSSGGGGAADIGAGLADALTAPLDHKDKSLQLTDQSVRKNEKLKLAQAQGAEKTYGNGDSLNTGKLNKDKVSRFDFIRQI
EVDGQLITLESGEFQYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIAGEHTSFDKLPKGGRATYRGTAFGSDDASG
KLTYTIDFAAKQGHGKIEHLKSPELNVDLAAADIKPDKKRHAVISGSVLYNQAEKGSYSLGIFGGQAQEVAGSAEVE
RHIGLAAKQ

FIG. 8G

> SEQ ID NO: 61

GGCAGCAGCGGAGCGCGGTGTCCGCCGCCGACATCGCGCGCGGTGCTTGCCGATGCACCTAACCCGACCGCTCGACCATAAAG
ACAAAAAGTTTGACGTCTTTGACGCTGGATCAGTCCGTCAAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
AACTTATGGAACGCGCAGCCCTCAATACGGGCAAAATTGAAGAACGACAAGGTCAAGCGCTTCGACTTTATCCGTCAAATC
GAAGTGGACGGGCAGCTCATTTACCTTGAGAGCGGAGAGTTCCAAGTGTAACAACAAAGCCATTCCGCCTTAAACCGCCCTTC
AGACCGAGCAAGTACAAGATTTCGGAGCATTCAGGGAAGATGGTTGCGAAACGCCAGTTCAGAAATCGGCGATATAGCGGGTGA
ACATACATCTTTTGACAAAGCTTCCCGAAGCGCGCAGGCGACATATCGCGGACGGCATTCGGTTCAGACGATGCCAGTGGA
AAACTGACCTACACCATAGATTTCGCCGCCAAGCAGGACACGGCAAAATCGAAATCGCCAGAACTCAATGTTG
ACCTGGCCGCTCCGATATCAAGCCGGATAAAAAACGCCATGCCGTCA TCAGCGGTTCCGTCCTTTACAAACCAAGCCGAGAA
AGGCAGTTACTCTCTAGGCATCTTTGGCGGGCAAGCCCAGGAAAGTTGCCGGCAGCGCAGAAAGTGGAACCCGCAACCGGCATA
CGCCATATCGGTCTTGCCGCCCAAGCAGTAA

> SEQ ID NO: 62

GSSGGGVAADIGAVLADALTAPLDHKDKSLQSLTLDQSVRKNEKLKLAQAQAEKTYNGDSLNTGKLKNDKVSFRDFIRQI
EVDGQLITLESGEFQYKQSHSALTALQTEQVQDSEHSGKMVAKRQFRIGDIAGEHTSFDKLP EGGRATYRGTAFGSDDASG
KLTYTIDFAAKQGHGKIEHLKSPELNVDLAASDIKPKKRHAVISGSVLYNQAEKGSYSLGIFGGQAQEVAGSAEVEETANGI
RHIGLAAKQ

FIG. 8H**> SEQ ID NO: 63**

GGCAGCAGCGGAGCGGGGTGTCGCCGCCGACATCGCGCGGGGGCTTGCCGATGCACCTAACCCGACCGCTCGACCATAAAG
 ACAAAAAGTTTGACGTCTTTGACGCTGGATCAGTCCGTGAGGAAAAACGAGAAACTGAAAGCTGGCGGCACAAGGTGCGGAAAA
 AACTTATGGAACGGCGACAGCCTCAATACGGGCAAAATTGAAGAACGACAAGGTGAGCCGCTTCGACTTTATCCGTCAAATC
 GAAGTGGACGGGCAGCTCATTTACCTTGGAGAGCGGAGAGTTCCAAATATACAAACAGGACCACTCCGCCGTCGTTGCCCTAC
 AGATTGAAAAAATCAACAACCCCGACAAAATCGACAGCCTGATAAACCAACGCTCCTTGTCTCAGCGGTTTGGGTGGAGA
 ACATACCGCCTTCAACCAACTGCCCAGCGGCAAAAGCCGAGTATCACGGCAAAAGCATTTCAGCTCCGACGATGCTGGCGGAAAA
 CTGACCTATACCATAGATTTCGCCGCCCAACAGGACACGGCAAAAATCGAACACTTGAAAAACACCCGAGCAAAAATGTCGAGC
 TTGCCTCCGCCGAACTCAAAGCAGATGAAAAATCACACGCCGTCATTTGGGCGACACGCGCTACGGCGCGGAGAAAAAGG
 CACTTACCACCTCGCCCTTTTCGGCGACCGCCCAAGAAATCGCCGGCTCGGCAACCGTGAAGATAAGGAAAAAGGTTTCAC
 GAAATCGGCATCGCCGGCAACAGTAA

> SEQ ID NO: 64

GSSGGGVAADIGAGLADALTAPLDHKDKSLQSLTLDQSVRKNEKLKLAQAQAEKTYNGDSLNTGKLKNDKVSFRDFIRQI
 EVDGQLITLESGEFQIYKQDHSVVVALQIEKINNPDKIDSLINQRSFLVSLGGEHTAFNQLPSGKAEYHGKAFSSDDAGGK
 LTYTIDFAAKQGHGKIEHLKTPEQNVELASAEIKADEKSHAVILGDTRYGGEEKGTYYHLALFGDRAQEIAGSATVKIREKVH
 EIGIAGKQ

FIG. 9A

1																						60
A05	(1)	CSSG	SSG	GGVAA	DIG	TGLAD	ALTAP	L	DHKD	KGL	KS	LT	LD	DS	IS	SON	GT	LT	LS	AAQGA	EKT	
A12	(1)	CSSG	---	GGVAA	DIG	GAGLAD	ALTAP	L	DHKD	KSL	QS	LT	LD	DQ	SVRK	NEKL	KL	AAQGA	EKT			
A22	(1)	CSSG	---	GGVAA	DIG	GAGLAD	ALTAP	L	DHKD	KSL	QS	LT	LD	DQ	SVRK	NEKL	KL	AAQGA	EKT			
A62	(1)	CSSG	---	GGVAA	DIG	GAGLAD	ALTAP	L	DHKD	KGL	QS	LT	LD	DQ	SVRK	NEKL	KL	AAQGA	EKT			
B09	(1)	CSSG	---	GGVAA	DIG	GAGLAD	ALTAP	L	DHKD	KGL	QS	LT	LD	DQ	SVRK	NEKL	KL	AAQGA	EKT			
B24	(1)	CSSG	---	GGVAA	DIG	GAGLAD	ALTAP	L	DHKD	KGL	QS	LT	LD	DQ	SVRK	NEKL	KL	AAQGA	EKT			
Consensus	(1)	CSSG		GGVAA	DIG	GAGLAD	ALTAP	L	DHKD	KGL	QS	LT	LD	DQ	SVRK	NEKL	KL	AAQGA	EKT			
																					120	
61																						
A05	(61)	YKVG	DKDN	SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GQ	LT	LE	SG	EFQ	IYKQ	DH	SA	VVAL	QIEK		
A12	(57)	YGN	GD	---	SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GQ	LT	LE	SG	EFQ	IYKQ	NH	SA	VVAL	QIEK	
A22	(57)	YGN	GD	---	SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GQ	LT	LE	SG	EFQ	IYKQ	DH	SA	VVAL	QIEK	
A62	(57)	YGN	GD	---	SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GK	LI	LE	SG	EFQ	IYKQ	SH	SA	LTAL	QIEQ	
B09	(57)	YGN	GD	---	SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GK	LI	LE	SG	EFQ	IYKQ	SH	SA	LTAL	QIEQ	
B24	(57)	YGN	GD	---	SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GQ	LI	LE	SG	EFQ	IYKQ	SH	SA	LTAL	QIEQ	
Consensus	(61)	YGN	GD		SLNT	GKLK	NDK	VS	RFDF	IRQ	IEVD	GQ	LI	LE	SG	EFQ	IYKQ	SH	SA	LTAL	QIEQ	

FIG. 9B

A05	(121)	INNPKIDSLINQRSFLVSGLGGEHTAFNQLPSG-KAEYHGKAFSSDDAGGKLT	180
A12	(114)	INNPKIDSLINQRSFLVSGLGGEHTAFNQLPDG-KAEYHGKAFSSDDPNGRILHYSIDFT	
A22	(114)	INNPKIDSLINQRSFLVSGLGGEHTAFNQLPSG-KAEYHGKAFSSDDAGGKLT	
A62	(114)	VQDSEDSGMVAKRQFRIGDIAGEHTSFDDKLPGGSAIYRGTAFFGSDDAGGKLT	
B09	(114)	VQDSEDSGMVAKRQFRIGDIAGEHTSFDDKLPGGSAIYRGTAFFGSDDAGGKLT	
B24	(114)	IQDSEHSGGMVAKRQFRIGDIAGEHTSFDDKLPEGGRATYRGTAFFGSDDAGGKLT	
Consensus	(121)	INNSDKSGSLINQRSFRISGIAGEHTAFNQLP GGKATYRGTAFFSSDDAGGKLT	
A05	(180)	AKQGHGKIEHLKTPEQNVELASAEELKADEKSHAVILGDTRYGSEEEKGTYHLALFGDRAQE	240
A12	(173)	KKQGYGRIEHLKTPEQNVELASAEELKADEKSHAVILGDTRYGSEEEKGTYHLALFGDRAQE	
A22	(173)	AKQGHGKIEHLKTPEQNVELASAEELKADEKSHAVILGDTRYGSEEEKGTYHLALFGDRAQE	
A62	(174)	AKQGHGKIEHLKTPEQNVELASAEELKADEKSHAVILGDTRYGSEEEKGTYHLALFGDRAQE	
B09	(174)	AKQGHGKIEHLKSPENVELATAATIKPDEKRHAVISGSVLYNQDEKGSYSLSLGIFFGGQAE	
B24	(174)	AKQGNKGIEHLKSPENVPLAADIKPDCGRHAVISGSVLYNQAEKGSYSLSLGIFFGGQAE	
Consensus	(181)	AKQGHGKIEHLKTPEQNVELASAEELKADEKSHAVILGDTRYGSEEEKGTYHLALFGDRAQE	
A05	(240)	IAGSATVKIREKVHEIGIAGKQ	262
A12	(233)	IAGSATVKIREKVHEIGIAGKQ	
A22	(233)	IAGSATVKIREKVHEIGIAGKQ	
A62	(234)	IAGSATVKIREKVHEIGIAGKQ	
B09	(234)	MAGSAEVEETANGIHHIGIAAKQ	
B24	(234)	MAGSAEVKTVNGIRHIGIAAKQ	
Consensus	(241)	IAGSATVKIREKVHEIGIAGKQ	
		(SEQ ID NO: 13)	
		(SEQ ID NO: 14)	
		(SEQ ID NO: 15)	
		(SEQ ID NO: 70)	
		(SEQ ID NO: 18)	
		(SEQ ID NO: 20)	
		(SEQ ID NO: 78)	