

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATA
AAAGTTTAAGTTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTAC
TACTGTTATAAATCATTATTAACATTAGAGTAAAGAAATATGGATGATAAGAAC
AAGAGTAGTGATATTTTGACAACAATTTTGTTGCAACATTTGAGAAAATTTTGTT
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TTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTTCCT
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AAATCTAAGCCACGTAGGAGGATAACAGGATCCCCGTAGGAGGATAACATCCA
ATCCAACCAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCCACGCATC
TGTGGCACATCTACATTATCTAAATCACACATTCTTCCACACATCTGAGCCACA
CAAAAACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAG
TCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAAT
TAATCATCTTGAGAGAAAATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTT
TCTCTTCTTGTTGGTTCCTTCTCAGATCT

GAGCTCTAAGTTAAAATGCTTCTTCGTCTCCTATTTATAATATGGTTTGTTATTG
TTAATTTTGTTCTTGTAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATT
TGTATGAGATGAACTGGTGTAAATGTAATTCATTTACATAAGTGGAGTCAGAATC
AGAATGTTTCCTCCATAACTAACTAGACATGAAGACCTGCCGCGTACAATTGTC
TTATATTTGAACAACATAAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTA
ATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTA
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CTTTGATAAATGATAGTACA

Fig. 1A

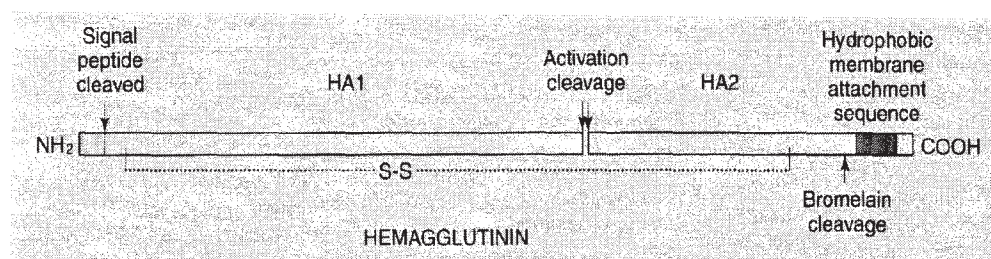


Fig. 1B

Fig. 2A

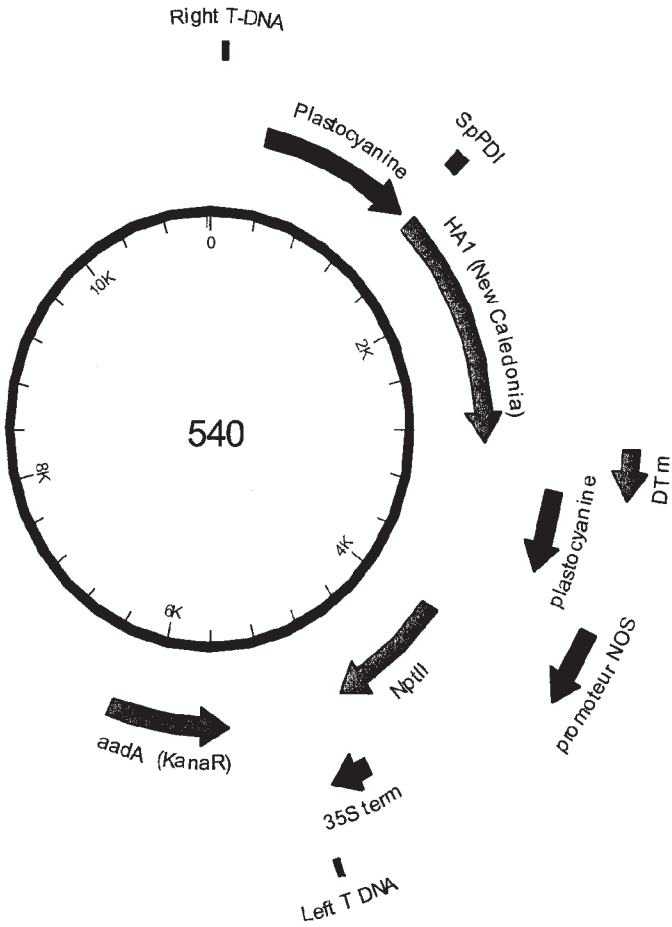


Fig. 2B

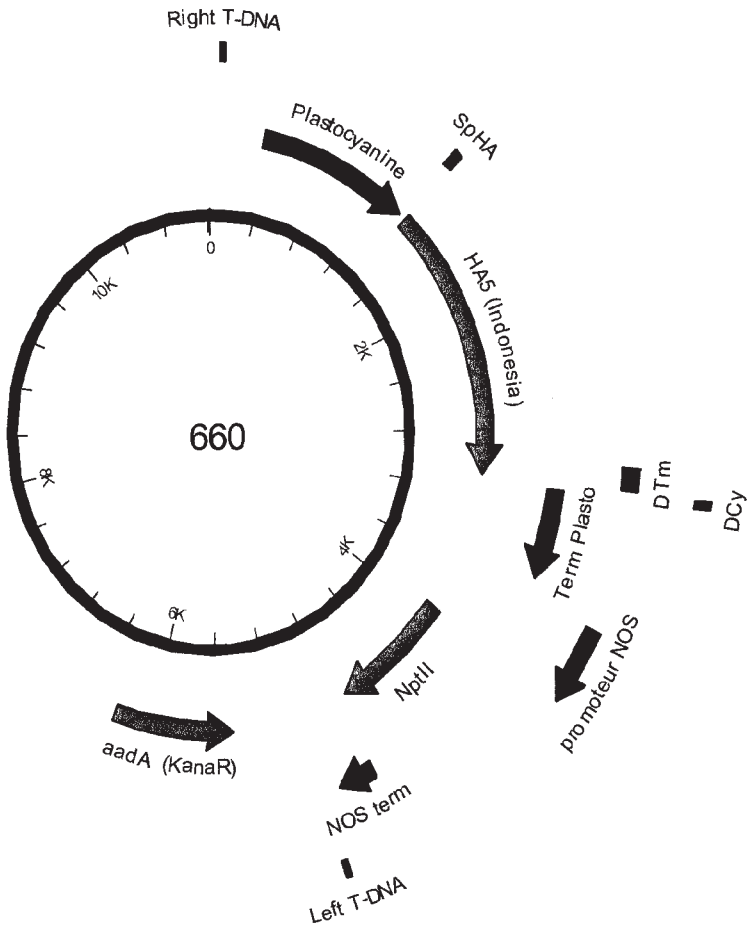


Fig. 3A

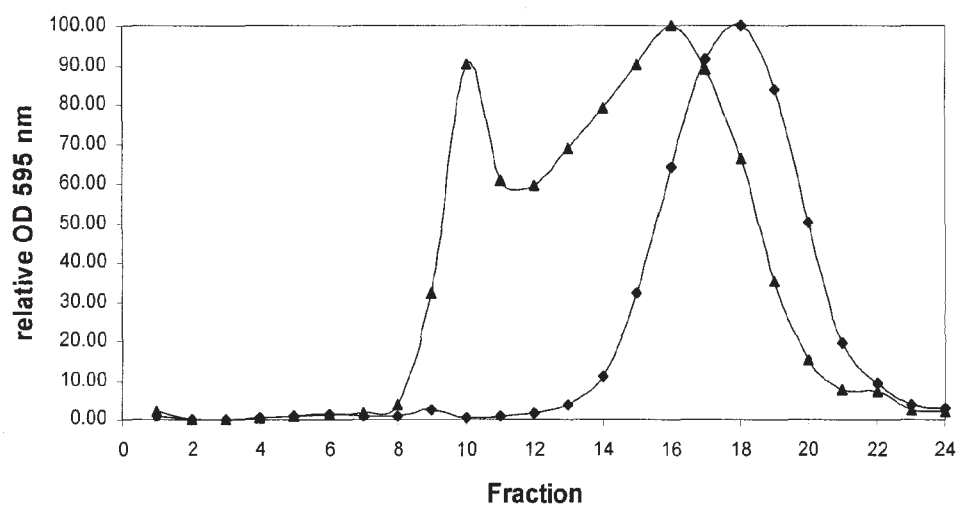


Fig. 3B

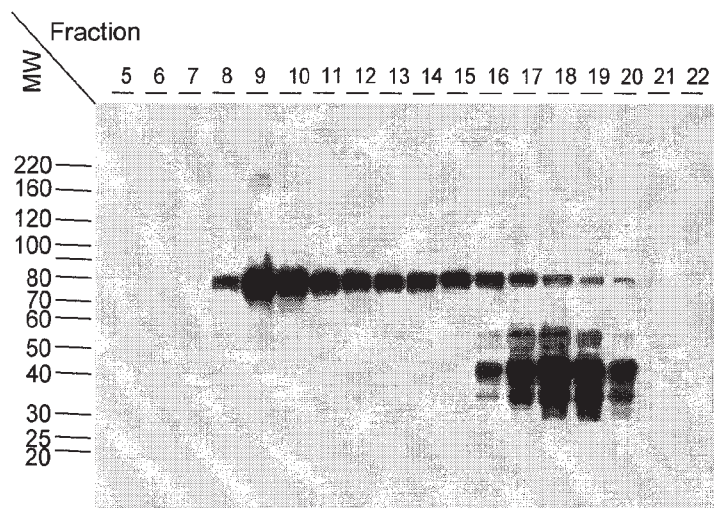


Fig. 3C

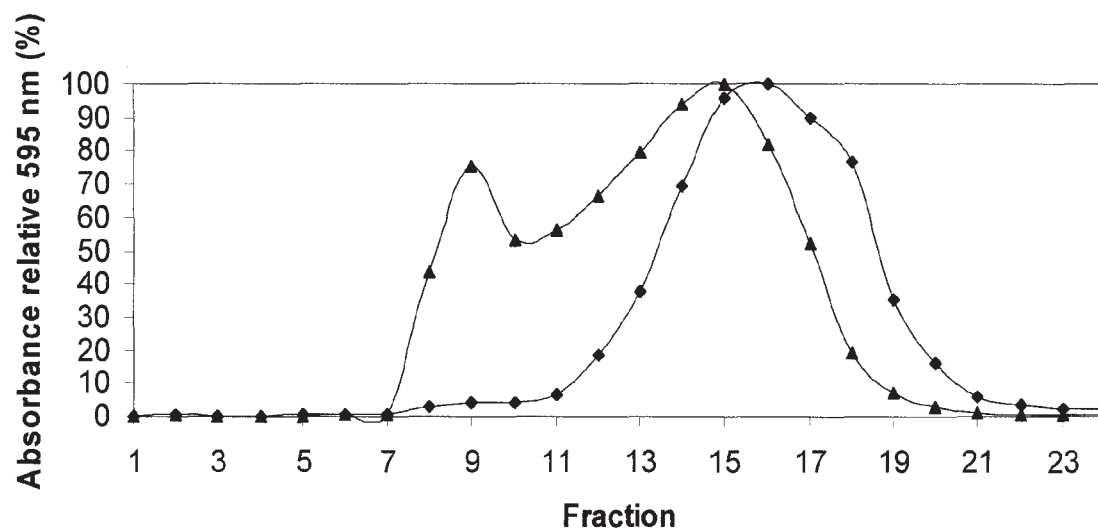


Fig. 3D

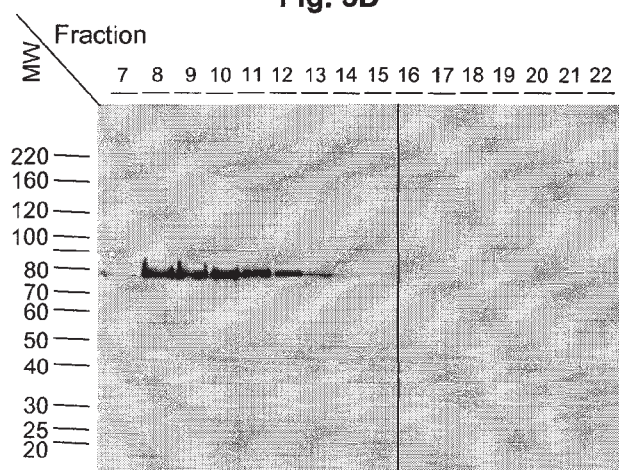


Fig. 4A

SEQ ID NO.1

AGATCTTCGCTGACACAATATGTATAGGCTACCATGCCAACAACTCAACCGACACTGTTGACACAGTAC
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ACTAAAAGGAATAGCCCCACTACAATTGGGTAATTGCAGCGTTGCCGGATGGATCTTAGGAAAACCCAGA
ATGCGAATTACTGATTTCCAAGGAATCATGGTCCTACATTGTAGAAACACCAAATCCTGAGAATGGAACA
TGTTACCCAGGGTATTTCCGCCGACTATGAGGAACTGAGGGAGCAATTGAGTTCAGTATCTTCATTTGAG
AGATTGCAAAATATTTCCCAAAGAAAGCTCATGGCCCAACCCACACCGTAACCGGAGTATCAGCATCATGC
TCCATAATGGGAAAAGCAGTTTTTACAGAAATTTGCTATGGCTGACGGGGAAGAATGGTTTGTAACCA
AACCTGAGCAAGTCCTATGTAAACAACAAAGAGAAAGAAGTCCTTGACTATGGGGTGTTTCATCACCCG
CCTAACATAGGGAACCAAAGGGCACTCTATCATACAGAAAATGCTTATGTCTCTGTAGTGTCTTCACATT
ATAGCAGAAGATTCACCCAGAAAATAGCCAAAAGACCCAAAGTAAGAGATCAGGAAGGAAGAATCAACT
ACTACTGGACTCTGCTGGAACCTGGGGATACAATAATTTTGGGCAAAATGGAAATCTAATAGCGCCAT
GGTATGCTTTTGCAGTGAGTAGAGGCTTTGGATCAGGAATCATCACCTCAAATGCACCAATGGATGAAT
GTGATGCGAAGTGTCAAACACCTCAGGGAGCTATAAACAGCAGTCTTCCTTTCCAGAATGTACACCCAG
TCACAATAGGAGAGTGTCCAAAGTATGTCAGGAGTGCAAAATTAAGGATGGTTACAGGACTAAGGAACA
TCCCATCCATTCAATCCAGAGGTTTGTGGAGCCATTGCCGGTTTCATTGAAGGGGGGTGGACTGGAA
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TCCATGACTCCAATGTGAAGAATCTGTATGAGAAAGTAAAAAGCCAATTAAGAATAATGCCAAAGAAAT
AGGAAACGGGTGTTTTGAGTTCTATCACAAAGTGAACAATGAATGCATGGAGAGTGTGAAAAATGGTAC
CTATGACTATCCAAAATATTCCGAAGAATCAAAGTTAAACAGGGAGAAAATTGATGGAGTGAAATTGGAA
TCAATGGGAGTATACTAAGAGCTCAGGCCT

Fig. 4B

SEQ ID NO. 2

GGTACCTATGACTATCCAAAATATTCCGAAGAATCAAAGTTAAACAGGGAGAAAATTGATGGAGTGAAAT
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CTCCCTGGGGGCAATCAGCTTCTGGATGTGTTCCAATGGGTCTTTCAGTGTAGAATATGCATCTTAAGA
GCTCAGGCCT

Fig. 5

HA0 from H1 (SEQ ID NO:28)

AGATCTTCGCTGACACAATATGTATAGGCTACCATGCCAACAACTCAACCGACACTGTTGACA
CAGTACTTGAGAAGAATGTGACAGTGACACACTCTGTCAACCTACTTGAGGACAGTCACAATG
GAAACTATGTCTACTAAAAGGAATAGCCCCACTACAATTGGGTAATTGCAGCGTTGCCGGAT
GGATCTTAGGAAACCCAGAATGCGAATTACTGATTTCCAAGGAATCATGGTCCTACATTGTAG
AAACACCAAATCCTGAGAATGGAACATGTTACCCAGGGTATTTGCCGACTATGAGGAACTGA
GGGAGCAATTGAGTTCAGTATCTTCATTGAGAGATTGGAATATTCCCCAAAGAAAGCTCAT
GGCCCAACCACACCGTAACCGGAGTATCAGCATCATGCTCCCATAAATGGGAAAAGCAGTTTTT
ACAGAAATTTGCTATGGCTGACGGGGAAGAATGGTTTGTACCCAAACCTGAGCAAGTCCTATG
TAAACAACAAAGAGAAAGAAGTCCTTGTACTATGGGGTGTTCATCACCCGCCTAACATAGGGA
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AAGATTCACCCAGAAATAGCCAAAAGACCCAAAGTAAGAGATCAGGAAGGAAGAATCAACTA
CTACTGGACTCTGCTGGAACCTGGGGATACAATAATTTGAGGCAAATGGAAATCTAATAGC
GCCATGGTATGCTTTTGCAGTGTAGAGGCTTTGGATCAGGAATCATCACCTCAAATGCACC
AATGGATGAATGTGATGCGAAGTGTCAAACACCTCAGGGAGCTATAAACAGCAGTCTTCCTTT
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GATGGTTACAGGACTAAGGAACATCCCATCCATTCAATCCAGAGGTTTGTGGAGCCATTGC
CGGTTTCATTGAAGGGGGGTGGACTGGAATGGTAGATGGGTGGTATGGTTATCATCATCAGA
ATGAGCAAGGATCTGGCTATGCTGCAGATCAAAAAAGTACACAAAATGCCATTAACGGGATTA
CAAACAAGGTCAATTCTGTAATTGAGAAAATGAACACTCAATTCACAGCTGTGGGCAAAGAGT
TCAACAAATTGAAAGAAGGATGGAAAACCTAAATAAAAAAGTTGATGATGGGTTTCTAGACAT
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TCCAATGTGAAGAATCTGTATGAGAAAGTAAAAAGCCAATTAAGAATAATGCCAAAGAAATAG
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GTACCTATGACTATCCAAAATATTCCGAAGAATCAAAGTTAAACAGGGAGAAAATTGATGGAG
TGAAATTGGAATCAATGGGAGTATACCAGATTCTGGCGATCTACTCAACTGTCGCCAGTTCCC
TGGTTCTTTTGGTCTCCCTGGGGGCAATCAGCTTCTGGATGTGTTCCAATGGGTCTTTGCAGT
GTAGAATATGCATCTAAGAGCTCAGGCCT

Fig. 6

SEQ ID NO. 3

AAGCTTATGGAGAAAATAGTGCTTCTTCTTGCAATAGTCAGTCTTGTTAAAAGTGATCAGATTTGCATTGG
TTACCATGCAAAACAATTCAACAGAGCAGGTTGACACAATCATGGAAAAGAACGTTACTGTTACACATGCC
CAAGACATACTGGAAAAGACACACAACGGGAAGCTCTGCGATCTAGATGGAGTGAAGCCTCTAATTTTA
AGAGATTGTAGTGTAGCTGGATGGCTCCTCGGGAACCCAATGTGTGACGAATTCATCAATGTACCGGAA
TGGTCTTACATAGTGGAGAAGGCCAATCCAACCAATGACCTCTGTTACCCAGGGAGTTTCAACGACTAT
GAAGAAGTGAACACCTATTGAGCAGAATAAACCATTTTGAAGAAAATTCAAATCATCCCCAAAAGTTCTTG
GTCCGATCATGAAGCCTCATCAGGAGTTAGCTCAGCATGTCCATACCTGGGAAGTCCCTCCTTTTTTGA
AATGTGGTATGGCTTATCAAAAAGAACAGTACATACCCAACAATAAAGAAAAGCTACAATAATACCAACCA
AGAGGATCTTTTGGTACTGTGGGGAATTCACCATCCTAATGATGCGGCAGAGCAGACAAGGCTATATCA
AAACCCAACCACTATATTTCCATTGGGACATCAACACTAAACCAGAGATTGGTACCAAAAATAGCTACT
AGATCCAAAGTAAACGGGCAAAGTGGAAGGATGGAGTTCTTCTGGACAATTTTAAACCTAATGATGCAA
TCAACTTCGAGAGTAATGGAAAATTTCAATGCTCCAGAATATGCATACAAAATTGTCAGAAAAGGGGACTC
AGCAATTATGAAAAGTGAATTGGAATATGGTAACTGCAACACCAAGTGTCAAACTCCAATGGGGGCGATA
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TATTTGGAGCTATAGCAGGTTTTATAGAGGGAGGATGGCAGGGAATGGTAGATGGTTGGTATGGGTACC
ACCATAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACTCAAAGGCAATAGATGGA
GTCACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAGTTTGAGGCCGTTGGAAGGGAATTTA
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TAATGCCGAACCTTCTGGTTCTCATGGAAAATGAGAGAACTCTAGACTTTTCATGACTCAAATGTTAAGAAC
CTCTACGACAAGGTCCGACTACAGCTTAGGGATAATGCAAAGGAGCTGGGTAACGGTTGTTTCGAGTTC
TATCACAAATGTGATAATGAATGTATGGAAAGTATAAGAAACGGAACGTACAACATATCCGCAGTATTCAG
AAGAAGCAAGATTAAGAAAGAGAGGAAATAAGTGGGGTAAAATTGGAATCAATAGGAACTTACCAATACT
GTCAATTTATTCAACAGTGGCGAGTTCCTAGCACTGGCAATCATGATGGCTGGTCTATCTTTATGGATG
TGCTCCAATGGATCGTTACAATGCAGAATTTGCATTTAAGAGCTC

Fig. 7A

SEQ ID NO. 4

5'-GTATTAGTAATTAGAATTGGTGTC-3'

Fig. 7B

SEQ ID NO. 5

5'-GCAAGAAGAAGCACTATTTTCTCCATTTTCTCTCAAGATGATTA-3'

Fig. 7C

SEQ ID NO. 6

5'-TTAATCATCTTGAGAGAAAATGGAGAAAATAGTGCTTCTTCTTGC-3'

Fig. 7D

SEQ ID NO. 7

5'-ACTTTGAGCTCTTAAATGCAAATTCTGCATTGTAACGA-3'

Fig. 8A

HA1 peptide sequence (SEQ ID NO:9)

MKAKLLVLLCTFTATYADTICIGYHANNSTDVDTVLEKNVTVTHSVNLED SHNGKLC LLKGIAPLQ
 LGNC SVAGWILGNPECELLISKESWSYIVETPNPENGT CYPGYFADYEELREQLSSVSSFERFEIFPK
 ESSWPNH TVTGV SASCSHNGKSSFYRNLLWLTGKNGLYPNLSKSYVNNKEKEVLVLWGVHHPPNI
 GNQRALYHTENAYVSVVSSHYSRRFTPEIAKRPKVRDQEGRINYWTLEPGDTIIFEANGNLIAPWY
 AFALSRGFGSGIITSNAPMDECDACQTPQGAINSSLPFQNVHPVTIGEC PKYVRS AKLRMVTGLRNI
 PSIQSRGLFGAIAGFIEGGWTGMVDGWYGYHHQNEQGS GYAADQKSTQNAINGITNKVNSVIEKMN
 TQFTAVGKEFNKLERRMENLNKKVDDGFLDIWTYNAELLVLENER TLD FHD SNVKNLYEKVKSQ LK
 NNAKEIGNGC FE FYHKCNNECMESVKNGTYDYPKYSEESKLNREKIDGVKLESMGVYQILAIYSTVA
 SSLVLLVSLGAISFWMCSNGSLQCRICI*

Fig. 8B

HA5 peptide sequence (SEQ ID No: 10)

MEKIVLLLAIVSLVKS DQICIGYHANNSTEQVDTIMEKNVTVTHAQDILEKTHNGKLC DLDGVKPLILR
 DCSVAGWLLGNPMCDEFIN VPEWSYIVEKANPTNDLCYPGSFNDYEELKHLLSRINHF EKI QIIPKSS
 WSDHEASSGVSSACPYLGSPSFFRN VVWLIKKNSTYPTIKKSYNNTNQEDLLVLWGIHHPNDAAEQ
 TRLYQNPTTYISIGTSTLNQRLVPKIATRSKVNGQSGRMEFFWTILKPNDAINFESNGNFI APEYAYKI
 VKKGDSAIMKSELEYGNCNTKCQTPMGAINSSMPFHNIHPLTIGEC PKYVKS NRLVLATGLRNSPQR
 ESRRKKRGLFGAIAGFIEGGWQGMVDGWYGYHHSNEQGS GYAADKESTQKAIDGVTNKVNSIIDK
 MNTQFEAVGREFN NLERRIENLNKKMEDGFLDWTYNAELLVLMENERTLD FHD SNVKNLYDKVRL
 QLRD NAKELGNGC FE FYHKCDNECMESIRNGTYNYPQYSEEARLKREEISGVKLESIGTYQILSIYST
 VASSLALAIMMAGLSLWMCSNGSLQCRICI*

Fig. 9**Subtype H7 (SEQ ID NO:11)**

>BHB940420|gb:AF071776|Symbol:HA|Name:hemagglutinin
precursor|Organism:Influenza A Virus A/chicken/New
York/1995|Chromosome:4|Subtype:H7|Host:Avian

GACAAAATATGTCTTGGGCACCATGCTGTGGCAAATGGAACAAAAGTGAACACATTAACAGAGAGGGGGA
TTGAAGTAGTGAACGCCACAGAGACGGTGGAACTGCGAATATCAAGAAAATATGTATTCAAGGGAAAAG
GCCAACAGATCTGGGACAATGTGGACTTCTAGGAACCTAATAGGACCTCCCCAATGTGATCAATTCCTG
GAGTTTACTCTGATTTGATAATTGAGCGAAGAGAAGGAACCGATGTGTGCTATCCCGGTAAATTCACAA
ATGAAGAATCACTGAGGCAGATCCTTCGAGGGTCAGGAGGAATTGATAAGGAGTCAATGGGTTTCACCTA
TAGTGGAATAAGAACCAATGGAGCGACAAGTGCCTGCAAAAGATCAGGTTCTTCTTTCTATGCAGAGATG
AAGTGGTTGCTGTGCAATTCAGACAATGCGGCATTCCCTCAAATGACAAAGTCGTATAGAAATCCCAGAA
ACAAACCAGCTCTGATAATTTGGGGAGTTCATCACTCTGGATCGGTTAGCGAGCAGACCAAACTCTATGG
AAGTGGAAAACAAGTTGATAACAGTAGGAAGCTCAAAATACCAGCAATCATTCACCCCAAGTCCGGGAGCA
CGGCCACAAGTGAATGGACAATCAGGGAGAATCGATTTTCACTGGCTACTCCTTGATCCCAATGACACAG
TGACCTTCACTTTCAATGGGGCATTCATAGCCCTGACAGGGCAAGTTTCTTTAGAGGAGAATCACTAGG
AGTCCAGAGTGATGTTCTCTGGATTCTAGTTGTGGAGGGGATTGCTTTCACAGTGGGGGTACGATAGTC
AGTTCCCTGCCATTCCAAAACATCAACCTAGAACTGTGGGGAGATGCCCTCGGTATGTCAAACAGACAA
GCCTCCTTTTGGCTACAGGAATGAGAAATGTTCCAGAGAATCCAAAGCCCAGAGGCCCTTTTGGAGCAAT
TGCTGGATTCATAGAGAATGGATGGGAGGGTCTCATCGATGGATGGTATGGTTTCAGACATCAAATGCA
CAAGGGGAAGGAAGTGCAGCTGACTACAAAAGCACCCAATCTGCAATAGATCAGATCACAGGCAAATTGA
ATCGTCTGATTGACAAAACAAATCAGCAGTTTGAGCTGATAGACAATGAGTTCAATGAGATAGAACAACA
AATAGGAAATGTCATTAATTGGACACGAGACGCAATGACTGAGGTATGGTCGTATAATGCTGAGCTGTTG
GTGGCAATGGAAAATCAGCATAACAATAGATCTTGCGGACTCAGAAATGAACAACTTTATGAGCGTGTCA
GAAAACAATAAGGGAGAATGCTGAAGAAGATGGAAGTGGATGTTTTGAGATATTCCATAAGTGTGATGA
TCAGTGCATGGAGAGCATAAGGAACAACACTTATGACCATACTCAATACAGAACAGAGTCATTGCAGAAT
AGAATACAGATAGACCCAGTGAAATTGAGTAGTGATACAAAGACATAATCTTATGGTTTAGCTTCGGGG
CATCATGTTTTCTTCTTAGCCGTTGTAATGGGATTGGTTTTTCATTTGCATAAAGAATGGAAACATGCG
GTGCACCATTTGTATATAA

Fig. 10A

Subtype H2 (SEQ ID NO:12)

>gi|408516|gb|L11132.1|FLADE88HA Influenza A virus (A/herring gull/DE/677/88 (H2N8)) hemagglutinin (HA) gene, complete cds

```
AGCAAAAGCAGGGGTTATACCATAGACAACCAAAGGCAAGACAATGGCCATCATTATCTAATTCTTCTG
TTCACAGCAGTGAGAGGGGACCAAATATGCATTGGATACCATTCCAACAATTCACAGAAAAGGTTGACA
CAATCCTAGAGAGAAATGTCACTGTGACTCACGCTGAGGACATTCTTGAGAAGACTCACAATGGGAAGTT
ATGCAAACTAAATGGAATCCCTCCACTTGAATTAAGGGATTGCAGCATTGCCGGATGGCTCCTTGGGAAT
CCAGAATGTGATATACTTCTAACTGTGCCAGAATGGTCATACATAATAGAAAAAGAAAATCCAAGGAACG
GCTTGTGCTACCCAGGCAGTTTCAATGATTATGAAGAATTGAAGCATCTTATCAGCAGCGTGACACATTT
TGAGAAAGTAAAGATTCTGCCCAGAAATGAATGGACACAGCATACAACAACCTGGAGGTTACAGGCTTGC
GCAGACTATGGTGGTCCGTCATTCTTCCGGAACATGGTCTGGTTGACAAAGAAAGGGTTCGAATTATCCAA
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CGTGGACTATCTTAGATATATGGGACACAATAAATTTTGAGAGTACTGGCAATCTAATTGCACCAGAATA
TGGTTTTCAAAATATCCAAACGAGGTAGTTCAGGGATCATGAAAACAGAAGGAAAACCTTGAAAACCTGCGAG
ACCAAGTGCCAACTCCTTTGGGAGCAATAAATACAACATTACCCTTTCACAATATCCACCCACTGACCA
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GATTGAGTCAAGGGGATTGTTTGGGGCAATAGCTGGTTTTATAGAGGGTGGATGGCAAGGAATGGTTGAT
GGTTGGTATGGGTATCATCACAGCAATGACCAGGGATCTGGGTATGCAGCAGACAAAGAATCCACTCAA
AGGCAATTGATGGAATCACCAACAAGGTAAATTCTGTGATCGAAAAGATGAACACCCAATTCCGAGCTGT
TGGAAAAGAATTTCAGTAACTTGGAGAGAAGACTGGAGAACTTGAATAAAAAGATGGAGGACGGATTCTA
GATGTGTGGACATACAATGCCGAGCTCCTAGTTCTAATGGAAAATGAGAGGACACTTGACTTTTCATGATT
CTAATGTCAAGAACTATATGATAAAGTCAGAATGCAACTGAGAGACAATGCAAAAGAACTAGGGAATGG
ATGTTTTGAATTTTATCACAAATGTGATGATGAATGCATGAACAGTGTGAAGAATGGGACATATGATTAT
TCCAAGTATGAAGAGGAGTCTAACTAAACAGGACTGAAATCAAAGGGGTAAATTGAGCAATATGGGGG
TTTATCAAATCCTTGCCATCTATGCTACAGTAGCAGGTTCCCTGTCACTGGCAATCATGATAGCTGGGAT
TTCTATATGGATGTGCTCCAACGGGTCTCTGCAATGCAGAATCTGCATATGATCATCAGTCATTTTGTAA
TTAAAAACACCCCTTGTTTCTACT
```

Fig. 10B**Subtype H3 (SEQ ID NO:13)**

>BHB2107299|gb:EF473574|Symbol:HA|Name:hemagglutinin|Organism:Influenza A
Virus A/Texas/32/2003|Segment:4|Subtype:H3|Host:Human

CAAAAACCTCCCGGAAATGACAACAGCACGGCAACGCTGTGCCTTGGGCACCATGCAGTACCAAACGGAA
CGATAGTGAAAACAATCACGAATGACCAAATTGAAGTTACTAATGCTACTGAGCTGGTACAGAGTTCCTC
AACAGGTGGAATATGCGACAGTCCTCATCAGATCCTTGATGGAGAAAACCTGCACACTAATAGATGCTCTA
TTGGGAGACCCTCAGTGTGATGGCTTCCAAAATAAGAAATGGGACCTTTTGTGTAACGCAGCAAAGCCT
ACAGCAACTGTTACCCTTATGATGTGCCGATTATGCCTCCCTTAGGTCAGTGTGCCTCATCCGGCAC
ACTGGAGTTTAAACAATGAAAGCTTCGATTGGACTGGAGTCACTCAGAATGGAACAAGCTCTGCTTGCAAA
AGGAGATCTAATAAAAGTTTCTTTAGTAGATTGAATTGGTTGACCCACTTAAAAATACAAATACCCAGCAT
TGAACGTGACTATGCCAAACAATGAAAAATTTGACAAATTGTACATTTGGGGGGTTCAACCACCGGGTAC
GGACAGTGACCAAATCAGCCTATATGCTCAAGCATCAGGAAGAATCACAGTCTCTACCAAAGAAGCCAA
CAAACGTGAATCCCGAATATCGGATCTAGACCCAGGGTAAGGGATGTCTCCAGCCGAATAAGCATCTATT
GGACAATAGTAAACCGGGAGACATACTTTTGATTAACAGCACAGGGAATCTAATTGCTCCTCGGGGTTA
CTTCAAATACGAAGTGGGAAAAGCTCAATAATGAGATCAGATGCACCCATTGGCAAATGCAATTCCGAA
TGCATCACTCCAATGGAAGCATTCCCAATGACAAACCATTTCAAATGTAAACAGGATCACATATGGGG
CCTGTCCCAGATATGTTAAGCAAAACACTCTGAAATTGGCAACAGGGATGCGAAATGTACCAGAGAAACA
AACTAGAGGCATATTTGGCGCAATCGCGGGTTTCATAGAAAATGGTTGGGAGGGAATGGTGGACGGTTGG
TACGGTTTTCAGGCATCAAAATTCTGAGGGCACAGGA

Fig. 10C

Subtype H4 (SEQ ID NO:14)

>BHB1050162|gb:DQ021859|Symbol:HA|Name:hemagglutinin|Organism:Influenza
A Virus A/mallard/MN/33/00|Segment:4|Subtype:H4|Host:Avian

ATGCTATCAATCACGATTCTGTTTCTGCTCATAGCAGAGGGTTCTCTCAGAATTACACAGGGAATCCCG
TGATATGCCTGGGACATCATGCCGTATCCAATGGGACAATGGTGAAAACCCTGACTGATGACCAAGTAGA
AGTTGTCACTGCCCCAAGAATTAGTGGAATCGCAACATCTACCGGAGTTGTGTCCTAGCCCTTAAGATTA
GTAGATGGACAAACTTGTGACATCGTCAATGGTGCCCTGGGGAGTCCAGGCTGTGATCACTTGAATGGTG
CAGAATGGGATGTCTTCATAGAACGACCCACTGCTGTGGACACTTGTTATCCATTTGATGTGCCGGATTA
CCAGAGCCTACGGAGTATCCTAGCAAACAATGGGAAATTTGAGTTTCATTGCTGAGGAATTCGAATGGAAC
ACAGTCAAACAAAATGGGAAATCCGGAGCATGCAAAAGAGCAAATGTGAATGACTTTTTCAACAGATTGA
ACTGGCTGACCAAATCTGATGGGAATGCATACCCACTTCAAAACCTGACAAAGGTTAACACGGGGACTA
TGCAAGACTTTACATATGGGGAGTTCATCATCCTTCAACTGACACAGAACAAACCAACTTGTATAAGAAC
AACCCTGGGAGAGTAACTGTTTCCACCAAAACCAGTCAAACAAGTGTGGTACCAACATTGGCAGTAGAC
CATGGGTAAAGAGGCCAAAGCGGCAGGATTAGCTTCTATTGGACAATTGTGGAGCCAGGAGACCTCATAGT
CTTCAACACCATAGGGAATTTAATTGCTCCGAGAGGTCAATTACAAGCTTAACAGTCAAAGAAGAGCACA
ATTCTGAATACTGCAATTCCCATAGGATCTTGTGTTAGTAAATGTCACACAGATAGGGGTTCAATCTCTA
CAACCAAACCCTTTCAGAACATCTCAAGAATATCAATTGGGGACTGTCCAAGTATGTCAAACAGGGATC
CTTGAAACTAGCTACAGGAATGAGGAATATCCCTGAGAAAGCAACCAGAGGCCTGTTTGGTGCAATTG

Fig. 10D**Subtype H5 (SEQ ID NO:15)**

>BHB950029|gb:AF501235|Symbol:HA|Name:hemagglutinin|Organism:Influenza A Virus
A/duck/Shanghai/1/2000|Segment:4|Subtype:H5|Host:Avian

ATGGAGAAAATAGTGCTTCTTCTTGCAATAGTCAGTCTTGTTAAAAGTGATCAGATTTGCATTGGTTACC
ATGCAACAACCTCGACAGAGCAGGTTGACACAATAATGGAAAAGAACGTTACTGTTACACATGCCCAAGA
CATACTGGAAAAGACACACAACGGGAACTCTGCGATCTAGATGGAGTGAAGCCTCTAATTTTGAGAGAT
TGTAAGTGTAGCTGGATGGCTCCTCGGAAACCTATGTGTGACGAATTCATCAATGTGCCGGAATGGTCTT
ACATAGTGGAGAAGGCCAGTCCAGCCAATGACCTCTGTTACCCAGGGGATTTCAACGACTATGAAGAACT
GAAACACCTATTGAGCAGAATAAACCACTTTGAGAAAATTGAGATCATCCCCAAAAGTTCTTGGTCCAAT
CATGAAGCCTCATCAGGGGTGAGCGCAGCATGTCCATACCATGGGAAGCCCTCCTTTTTCAGAAATGTGG
TATGGCTTATCAAAAAGAACAGTGCATACCCAACAATAAAGAGGAGCTACAATAATACCAACCAAGAAGA
TCTTTTGGTACTGTGGGGGATTACCATCCTAATGATGCGGCAGAGCAGACAAAGCTCTATCAAAACCCA
ACCACCTATATTTCCGTTGGAACATCAACACTAAACCAGAGATTGGTCCCAAAAATAGCTACTAGATCCA
AAGTAAACGGGCAAAGTGAAGAATGGAGTTCTTCTGGACAATTTTAAAGCCGAATGATGCCATAAAATTT
CGAGAGTAATGGAAATTTTCATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGGGGACTCAGCAATT
ATGAAAAGTGAATTGGAATATGGTAACTGCAACACCAAGTGTCAAACCTCCAATGGGGGCGATAAACTCTA
GTATGCCATTCCACAACATACACCCTCTCACAATCGGGGAATGCCCCAAATATGTGAAATCAAACAGATT
AGTCCTTGCGACTGGACTCAGAAATACCCCTCAAAGAGATAGAAGAAGAAAAAGAGAGGACTATTTGGA
GCTATAGCAGGTTTTATAGAGGGAGGATGGCAAGGAATGGTAGATGGTTGGTATGGGTACCACCATAGCA
ATGAGCAGGGGAGTGGATACGCTGCAGACAAAGAATCCACTCAAAGGCAATAGATGGAGTCACCAATAA
GGTCAACTCGATCATTGACAAAATGAACACTCAGTTTGAGGCCGTTGGAAGGGAATTTAATAACTTAGAA
AGGAGGATAGAAAATTTAAACAAGAAGATGGAAGACGGATTCCTAGATGTCTGGACTTATAATGCTGAAC
TTCTGGTTCTCATGGAAAATGAGAGAATCTAGACTTTTCATGATTCAAATGTCAAGAACCCTTTACAACAA
GGTCCGACTACAGCTTAGGGATAATGCAAAGGAGCTGGGTAATGGTTGTTTCGAGTTCTATCACAAATGT
GATAATGAATGTATGGAAAGTGTAACCAACGGGACGTATGACTACCCGAGTATTCAGAAGAAGCAAGAC
TAAACAGAGAGGAAATAAGTGGAGTAAATTTGGAATCAATGGGAACCTACCAAATACTGTCAATTTATTC
AACAGTGGCGAGTTCCCTAGCACTGGCAATCATGGTAGCTGGTCTATCTTTATGGATGTGCTCCAATGGG
TCGTTACAATGCAGAATTTGCATTTAA

Fig. 10E**Subtype H6 (SEQ ID NO:16)**

>BHB1049778|gb:DQ021667|Symbol:HA|Name:hemagglutinin|Organism:Influenza
A Virus A/northern pintail/TX/828189/02|Segment:4|Subtype:H6|Host:Avian

ATGATTGCAATCATTGTAATAGCGATACTGGCAGCAGCCGAAAGTCAGACAAGATCTGCATTGGGTATC
ATGCCAACAATTCAACAACACAGGTGGATACGATACTTGAGAAGAATGTAACCGTCACACACTCAGTTGA
ATTGCTGGAGAATCAGAAGGAAGAAAGATTCTGCAAGATCTTGAACAAGGCCCTCTCGACCTAAAGGGA
TGCACCATAGAGGGTTGGATCTTGGGGAATCCCCAATGCGATCTGTTGCTTGGTGACCAAAGCTGGTCAT
ATATAGTGGAAAGACCTACTGCCCAAAATGGGATATGCTACCCAGGAGCTTTGAATGAGGTAGAAGA
GAAAGCATTTATCGGATCAGGAGAAAGGGTAGAGAGATTTGAGATGTTTCCCAAAAGCACATGGGCAGGG
GTAGACACCAGCAGTGGGGTAACAAAAGCTTGTCCTTATAATAGTGGTTCATCTTTCTACAGAAACCTCC
TATGGATAATAAAGACCAAGTCAGCAGCGTATCCAGTAATTAAGGGAACTTACAGCAACACTGGAAACCA
GCCAATCCTCTATTTCTGGGGTGTGCACCATCCTCCTGACACCAATGAGCAAAATACTCTGTATGGCTCT
GGCGATCGGTATGTTAGGATGGGAACTGAGAGCATGAATTTTGCCAAGAGCCCAGAAATTGCGGCAAGAC
CCGCTGTGAATGGCCAAAGAGGTCGAATTGATTATTACTGGTCTGTTTTAAACCAGGAGAAACCTTGAA
TGTGGAATCTAATGGAAATCTAATCGCTCCTTGGTATGCATACAAATTTGTCAACACAAATAATAAGGGA
GCCGTCTTCAAGTCAAATTTACCAATCGAGAATTGCGATGCCACATGCCAGACTATTGCAGGAGTCCTAA
GGACCAATAAAACATTTTCAAGATGTGAGCCCTCTGTGGATAGGAGAATGCCCCAAGTATGTGAAAAGTGA
AAGTCTAAGGCTTGCTACTGGACTAAGAAATGTTCCACAGATTGAAACCAGAGGGCTTTTCGGAGCTATC

Fig. 10F**Subtype H8 (SEQ ID NO:17)**

>gi|221317|dbj|D90304.1|FLAH8N4 Influenza A virus
(A/Turkey/Ontario/6118/68(H8N4)) gene for hemagglutinin precursor, complete
cds

ATGGAAAAATTCATCGCAATAGCAACCTTGGCGAGCACAAATGCATACGATAGGATATGCATTGGGTACC
AATCAAACAACCTCCACAGACACAGTGAACACTCTCATAGAACAGAATGTACCAGTCACCCAAACAATGGA
GCTCGTGGAACAGAGAAACATCCCGCTTATTGTAACACTGATTTAGGTGCCCCATTGGAAGTGCAGAC
TGCAAGATTGAGGCAGTAATCTATGGGAACCCCAAGTGTGACATCCATCTGAAGGATCAAGGTTGGTCAT
ACATAGTGGAGAGGCCCAGCGCACCAGAAGGGATGTGTTACCCTGGATCTGTGGAAAATCTAGAAGAACT
GAGGTTTGTCTTCTCCAGTGTGTCATCTTACAAGAGAATAAGACTATTTGACTATTCAGGTGGAATGTG
ACTAGATCTGGAACGAGTAAAGCATGCAATGCATCAACAGGTGGCCAATCCTTCTATAGGAGCATCAATT
GGTTGACCAAAAAGGAACCAGACACTTATGACTTCAATGAAGGAGCTTATGTTAATAATGAAGATGGAGA
CATCATTTTCTTATGGGGATCCATCATCCGCCGACACAAAAGAGCAGACAACACTATATAAAAATGCA
AACACTTTGAGTAGTGTTACTACTAACACTATAAACAGAAGCTTTCAACCAAATATTGGTCCCAGACCAT
TAGTAAGAGGACAGCAAGGGAGGATGGATTACTATTGGGGCATTCTGAAAAGAGGGGAGACTCTGAAGAT
CAGGACCAACGGAATTTAATCGCACCTGAATTTGGCTATCTGCTCAAAGGTGAAAGCTACGGCAGAATA
ATTCAAAATGAGGATATACCCATCGGGAACGTAAACACAAAATGTCAAACATATGCGGGAGCAATCAATA
GCAGCAAACCCTTTCAGAAATGCAAGTAGGCATTACATGGGAGAATGTCCCAAATATGTGAAGAAGGCAAG
CTTGCGACTTGCAAGTTGGGCTTAGGAATACGCCCTTCTGTTGAACCCAGAGGACTGTTTGGAGCCATTGCT
GGTTTCATTGAAGGAGGATGGTCTGGAATGATTGATGGGTGGTATGGATTTTCATCACAGCAATTCAGAGG
GAACAGGAATGGCAGCTGACCAGAAATCAACACAAGAAGCCATCGATAAGATCACCAATAAAGTCAACAA
TATAGTTGACAAGATGAACAGGGAGTTTGAAGTTGTGAATCATGAGTTCTCTGAAGTTGAAAAAGAATA
AACATGATAAACGATAAAATAGATGACCAAATGAAGATCTTTGGGCTTACAATGCAGAGCTCCTTGTGC
TCTTAGAGAACCAGAAAACGCTAGACGAACATGATTCCAATGTCAAAAACCTTTTTGATGAAGTGAAAAG
GAGACTGTCAGCCAATGCAATAGATGCTGGGAACGGTTGCTTTGACATACTTCACAAATGCGACAATGAG
TGTATGGAACTATAAAGAACGGAACCTACGATCATAAGGAATATGAAGAGGAGGCTAAACTAGAAAGGA
GCAAGATAAATGGAGTAAACTAGAAGAGAACACCACTTACAAAATCTTAGCATTTACAGTACAGTGGC
GGCCAGTCTTTGCTTGCCAATCCTGATTGCTGGAGGTTTAATCCTGGGCATGCAAAATGGATCTTGTA
TGCAATGTTCTGTATTTGA

Fig. 10G**Subtype H9 (SEQ ID NO:18)**

>BHB954830|gb:AM087218|Symbol:HA|Name:hemagglutinin|Organism:Influenza A Virus
A/shoveler/Iran/G54/03|Segment:4|Subtype:H9|Host:Avian

ATGGAAACAGTATCACTAATGACTATACTACTAGTAGCAACAGCAAGCAATGCAGACAAAATCTGCATCG
GCCACCAGTCAACAACTCCACAGAACTGTGGACACGCTAACAGAAACCAATGTTCTGTGACACATGC
CAAAGAATTGCTCCACACAGAGCACAATGGAATGCTGTGTGCAACAAATCTGGGACATCCCCTAATCTTA
GACACGTGCACTATTGAAGGACTGATCTATGGTAACCTTCTTGTGACTTGCTGTTGGGAGGAAGAGAAT
GGTCTTACATCGTCGAAAGGTCATCAGCTGTAAATGGAACGTGTTACCCTGGGAATGTAGAGAACCTAGA
GGAAGTCAGGACACTTTTTAGTTCCGCTAGTTCTTACCGAAGAATCCAAATCTTCCCAGACACAATCTGG
AATGTGACTTACACTGGAACAAGCAAAGCATGTTTCAGATTCTTCTACAGGAGTATGAGATGGCTGACTC
AAAAAAGCGGGTCTTACCCTGTTCAAGACGCTCAATACACAAATAATATGGGAAAGAGCATTTCTTTTCGT
GTGGGGCATACATCACCACCCACTGAAGCTGCACAGACAAATTTGTACACAAGAACCGACACAACAACA
AGCGTGACAACAGAAGACTTAAATAGGATCTTCAAACCGATGGTAGGGCCAAGGCCCTTGTCAATGGTC
TGCAGGAAGAATTAATTATTATTGGTCGGTACTAAAACCAGGCCAGACACTGCGAGTAAGATCCAATGG
GAATCTAATTGCTCCATGGTATGGACACATTCTTTTCGGGAGGGAGCCATGGAAGAATCCTGAAGACTGAT
TTAAAAAGTAGTAATTGCGTAGTGCAATGTGCACTGAAAAAGGCGGCTTAAACAGTACATTGCCGTTCC
ACAATATCAGTAAATATGCATTTGGAACTGTCCCAATATGTTAGAGTTAAAAGTCTCAAAGTGGCAGT
AGGGTTGAGGAACGTGCCTGCTAGATCAAGTAGAGGACTATTCGGAGCCATAGCTGGATTTCATAGAAGGA
GGTTGGCCAGGACTAGTCGCTGGTTGGTATGGTTTCCAGCATTCAAATGATCAAGGGGTTGGTATTGCGG
CAGATAGGGATTCAACTCAAAGGCAATTGATAGAATAACAACCAAGGTGAATAATATAGTCGACAAAAT
GAACAAACAATATGAAATAATTGATCATGAATTCAGTGAGGTTGAACTAGGCTCAACATGATCAATAAT
AAGATTGATGACCAATAACAAGACATATGGGCATATAATGCAGAGTTGCTAGTACTACTTGAAAACCAGA
AAACACTCGATGAGCATGACGCAAATGTGAAGA

Fig. 10H**Subtype H10 (SEQ ID NO:19)**

>gi|324365|gb|M21647.1|FLAMS84HA Influenza A virus
(A/chicken/Germany/N/1949(H10N7)) hemagglutinin precursor,
gene, complete cds

AGCAAAAGCAGGGGTACAATGTACAAAGTAGTAGTAATAATTGCGCTCCTTGGAGCAGTGAAAGGTCTT
GACAGAATCTGCCTAGGACACCATGCGGTTGCCAATGGAACCATTGTGAAGACCCTTACAAATGAACAAG
AGGAAGTGACCAATGCTACTGAGACGGTAGAGAGCACAATTTGAATAAATTGTGTATGAAAGGAAGAAG
CTACAAGGACTTGGGCAATTGTCACCCGGTAGGAATGTTGATAGGAACACCTGTTTGTGATCCGCACTTG
ACCGGGACCTGGGACACTCTCATTGAGCGAGAGAATGCCATTGCCCACTGTTATCCAGGGGCAACCATAA
ATGAAGAAGCATTGAGGCAGAAAATAATGGAAAGTGAGGAATCAGCAAGATGAGCACTGGCTTCACTTA
TGGGTCTTCCATCACCTCAGCTGGGACCACCTAAGGCATGCATGAGAAATGGAGGAGATAGTTTCTATGCA
GAGCTCAAAATGGCTAGTGTCAAAGACAAAGGGACAAAATTTCCCTCAGACAACAAACACCTATCGGAATA
CGGACACAGCAGAACATCTCATAATATGGGGAATTCATCACCCCTTCCAGCACACAGGAAAAGAATGACTT
ATACGGAACTCAGTCACTATCTATATCAGTTGAGAGTTCTACATATCAGAACAACTTTGTTCCAGTTGTT
GGGGCAAGACCTCAGGTCAATGGACAAAGTGGGCGAATTGACTTTCCTGGACACTAGTACAGCCGGGTG
ACAACATAACCTTCTCAGACAATGGAGGTCTAATAGCACCAGTTCGAGTTAGCAAATTAACCTGGAAGGGA
TTTGGGAATCCAATCAGAAGCGTTGATAGACAACAGTTGTGAATCCAAATGCTTTTGGAGAGGGGGTCTCT
ATAAATACAAAGCTCCCTTTTCAAATCTGTCACCCAGAACAGTAGGTCAATGCCCCAAATACGTAAATC
AGAGGAGTTTACTGCTTGCAACAGGGATGAGGAATGTCCAGAAAGTGGTGCAGGGAAGGGGTCTGTTTGG
TGCAATAGCAGGGTTCATAGAAAACGGATGGGAAGGAATGGTAGACGGCTGGTATGGTTTCAGACACCAA
AATGCCCAGGGCACAGGCCAAGCTGCTGATTACAAGAGTACTCAAGCAGCTATTGACCAAATCAGAGGA
AACTGAACAGGTTGATTGAGAAGACCAACACTGAGTTTGAGTCAATAGAATCTGAATTCAGTGAGACTGA
GCATCAAATTTGGTAACGTCATTAATTGGACCAAAGATTCAATAACCGACATTTGGACTTACAACGCAGAG
CTATTAGTGGCAATGGAGAATCAGCACACAATTGACATGGCTGATTGAGAGATGCTAAATCTGTATGAAA
GGGTAAGAAAGCAACTCAGACAGAATGCAGAAGAAGACGGAAAGGGATGTTTTGAGATATATCATACTTG
TGATGATTTCGTGCATGGAGAGTATAAGGAACAATACTTATGACCATTACAATACAGAGAGGAGGCTCTT
CTGAATAGACTGAACATCAACCCAGTGAACTTTCTTCGGGGTACAAAGACATCATACTTTGGTTTAGCT
TCGGGGAATCATGCTTTGTTCTTCTAGCCGTTGTTATGGGTCTTGTTTTCTTCTGCCTGAAAAATGGAAA
CATGCGATGCACAATCTGTATTTAGTTAAAAACACCTTGTTTCTACT

Fig. 10I**Subtype H11 (SEQ ID NO:20)**

>gij221307|dbj|D90306.1|FLAHAH11N Influenza A virus (A/duck/England/56(H11N6)) gene for hemagglutinin precursor, complete cds

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ATGGAGAAAACACTGCTATTTGCAGCTATTTTCCTTTGTGTGAAAGCAGATGAGATCTGTATCGGGTATT
TAAGCAACAACTCGACAGACAAAGTTGACACAATAATTGAGAACAAATGTCACGGTCACTAGCTCAGTGGA
ACTGGTTGAGACAGAACACACTGGATCATTCTGTTCAATCAATGGAAAACAACCAATAAGCCTTGGAGAT
TGTTCAATTTGCTGGATGGATATTAGGAAACCCATGTGTGATGAACATAATTGGAAAGACTTCATGGTCTT
ACATTTGTGGAAAAACCAATCCAACAAATGGAATCTGTTACCCAGGAACCTTTAGAGAGTGAAGAAGAACT
AAGACTGAAATTCAGTGGAGTTTTAGAATTTAACAAATTCGAAGTATTCACATCAAATGGATGGGGTGCT
GTAAATTCAGGAGTAGGAGTAACCGCTGCATGCAAAATTCGGGGGTTCTAATTCCTTTCTTCGAAACATGG
TATGGCTGATACACCAATCAGGAACATATCCTGTAATAAGAGAACCTTTAACACACACCAAGGGAGAGA
TGTACTGATTGTTTGGGGAATTCATCATCCTGCTACACTGACAGAACATCAAGATCTGTATAAAAAGGAC
AGCTCCTATGTAGCAGTGGGTTGAGAGACCTACAACAGAAGATTCACTCCAGAAATCAACACTAGGCCCA
GAGTCAATGGACAGGCCGGACGGATGACATTCTACTGGAAGATAGTCAAACCAGGAGAATCAATAACATT
CGAATCTAATGGGGCGTTTCCTAGCTCCTAGATATGCTTTTGAGATTGTCTCTGTTGGAAATGGGAACTG
TTCAGGAGCGAACTGAACATTGAATCATGCTCTACCAAATGTCAAACAGAAATAGGAGGAATTAATACGA
ACAAAAGCTTCCACAATGTTTACAGAAACACTATCGGGGATTGCCCCAAGTATGTGAATGTCAAATCCTT
AAAGCTTGCAACAGGACCTAGAAATGTCCAGCAATAGCATCGAGAGGCTTGTTTGGAGCAATAGCTGGA
TTCATAGAAGGGGGATGGCCTGGACTGATCAATGGATGGTATGGGTTCCAACACAGGGACGAAGAAGGAA
CAGGCATTGCAGCAGACAAGGAGTCAACTCAAAGGCAATAGACCAGATAACATCCAAGGTAAATAACAT
CGTTGACAGGATGAATACAACTTTGAGTCTGTGCAACACGAATTCAGTGAAATAGAGGAAAGAATAAAT
CAATTATCAAAACACGTAGATGATTCTGTGGTTGACATCTGGTCATATAATGCACAGCTTCTCGTTTAC
TTGAAAATGAGAAGACACTGGACCTCCATGACTCAAATGTCAGGAACCTCCATGAGAAAGTCAGAAGAAT
GCTAAAGGACAATGCCAAAGATGAGGGGAACGGATGCTTCACCTTTTACCATAAGTGTGACAATAAATGC
ATTGAACGAGTTAGAAACGGAACATATGATCATAAAGAATTTCGAGGAGGAATCAAAAATCAATCGCCAGG
AGATTGAAGGGGTGAAACTAGATTCTAGTGGGAATGTGTATAAAATACTGTCAATTTACAGCTGCATTGC
AAGCAGTCTTGATTGGCAGCACTCATCATGGGGTTCATGTTTTGGGCATGCAGTAATGGATCATGTAGA
TGTACCATTTGCATTTAG
```

Fig. 10J

Subtype H12 (SEQ ID NO:21)

>gj|221309|dbj|D90307.1|FLAH12N Influenza A virus (A/duck/Alberta/60/76(H12N5)) gene for hemagglutinin precursor, complete cds

ATGGAAAAATTCATCATTTTGGAGTACTGTCTTGGCAGCAAGCTTTGCATATGACAAAATTTGCATTGGAT
ACCAAACAAACAACTCGACTGAAACGGTAAACACACTAAGTGAACAAAACGTTCCGGTGACGCAGGTGGA
AGAACTTGACATCGTGGGATTGATCCGATCCTGTGTGGAACGGAAGTGGATCACCACCTAGTGCTTGTAT
GACTGTTTATTAGAGGGTCTAATCCTAGGCAATCCCAAATGTGATCTTTATTTGAATGGCAGGGAATGGT
CATACATAGTAGAGAGGCCCAAAGAGATGGAAGGAGTTTGCATCCAGGGTCAATTGAAAACAGGAAGA
GCTAAGATCTCTGTTTCTTCCATCAAAAAATATGAAAGAGTGAAGATGTTTGATTTACCAAATGGAAT
GTCACATACACTGGGACCAGCAAGGCCTGCAATAATACATCAAACCAAGGCTCATTCTATAGGAGCATGA
GATGGTTGACCTTAAATCAGGACAATTTCCAGTCCAAACAGATGAGTACAAGAACACCAGAGATTGAGA
CATTGTATTACCTGGGCCATTACCAACCCACCAACATCTGATGAACAAGTAAAATTATACAAAAATCCT
GATACTCTCTCTTCACTCACCACCGTAGAAATCAATAGGAGCTTCAAGCCTAATATAGGGCCAAGACCAC
TCGTGAGAGGACAACAAGGGAGAATGGATTACTACTGGGCTGTTCTTAAACCTGGACAAACAGTCAAAAT
ACAAACCAATGGTAATCTTATTGCACCTGAATATGGTCACCTAATCACAGGGAAATCACATGGCAGGATA
CTCAAGAATAATTTGCCCATGGGACAGTGTGTGACTGAATGTCAATTGAACGAGGGTGTAATGAACACAA
GCAAACCTTTCCAGAACACTAGTAAGCACTATATTGGGAAATGCCCCAAATACATACCATCAGGGAGTTT
AAAATTGGCAATAGGGCTCAGGAATGTCCACAAGTTCAAGATCGGGGGCTCTTTGGAGCAATTGCAGGT
TTCATAGAAGGCGGATGGCCAGGGCTAGTGGCTGGTTGGTACGGATTTCAGCATCAAAATGCGGAGGGGA
CAGGCATAGCTGCAGACAGAGACAGCACCCAAAGGGCAATAGACAATATGCAAAACAACTCAACAATGT
CATCGACAAAATGAATAAACAATTTGAAGTGGTGAATCATGAGTTTTTCAGAAGTGGAAAGCAGAATAAAC
ATGATTAATTCAAAAATTGATGATCAGATAACTGACATATGGGCATACAATGCTGAATTGCTTGTCTTAT
TGGAAAATCAGAAGACATTAGATGAGCATGACGCTAATGTAAGGAATCTACATGATCGGGTCAGAAGAGT
CCTGAGGGAAAATGCAATTGACACAGGAGACGGCTGCTTTGAGATTTTACATAAATGTGACAACAATTGT
ATGGACACGATTAGAAACGGGACATACAATCACAAAGAGTATGAGGAAGAAAGCAAAATCGAACGACAGA
AAGTCAATGGTGTGAACTTGAGGAGAATTCTACATATAAAATTTCTGAGCATCTACAGCAGTGTTCCTC
AAGCTTAGTTCTACTGCTCATGATTATTGGGGGTTTCATTTTCGGGTGTCAAAATGGAATGTTTCGTTGT
ACTTTCTGTATTTAA

Fig. 10K

Subtype H13 (SEQ ID NO:22)

>gi|221311|dbj|D90308.1|FLAHAH13N Influenza A virus
(A/Gull/Maryland/704/77(H13N6)) gene for hemagglutinin precursor, complete cds

ATGGCTCTAAATGTCATTGCAACTTTGACACTTATAAGTGTATGTGTACATGCAGACAGAATATGCGTGG
GGTATCTGAGCACCAATTCATCAGAAAGGGTCGACACGCTCCTTGAAAATGGGGTCCCAGTCACCAGCTC
CATTGATCTGATTGAGACAAACCACACAGGAACATACTGTTCTCTAAATGGAGTCAGTCCAGTGCATTTG
GGAGATTGCAGCTTTGAAGGATGGATTGTAGGAAACCCAGCCTGCACCAGCAACTTTGGGATCAGAGAGT
GGTCATACCTGATTGAGGACCCCGCGGCCCTCATGGGCTTTGCTACCCTGGAGAATTAAACAACAATGG
TGAATCAGACACTTGTTCAGTGGAAATCAGGTCATTCAGTAGAACGGAATTGATCCACCTACCTCCTGG
GGGGAAGTACTTGACGGTACAACATCTGCTTGCGAGAGATAACACGGGAACCAACAGCTTCTATCGAAATT
TAGTTTGCTTTATAAAGAAGAATACTAGATATCCAGTTATCAGTAAGACCTACAACAATACAACGGGAAG
GGATGTTTTAGTTTTATGGGAATACATCACCAGTGTCTGTGGATGAGACAAAGACTCTGTATGTCAAT
AGTGATCCATACACACTGGTTTCCACCAAGTCTTGAGCGAGAAATATAAACTAGAAACGGGAGTCCGAC
CTGGCTATAATGGACAGAGGAGCTGGATGAAAATTTATTGGTCTTTGATACATCCAGGGGAGATGATTAC
TTTCGAGAGTAATGGTGGATTTTTAGCCCCAAGATATGGGTACATAATTGAAGAATATGGAAAAGGAAGG
ATTTTCCAGAGTCGCATCAGAATGTCTAGGTGCAACACCAAGTGCCAGACTTCGGTTGGAGGGATAAACA
CAAACAGAACGTTCCAAAACATCGATAAGAATGCTCTTGTTGACTGTCCCAAATACATAAAGTCTGGCCA
ACTCAAGCTAGCCACTGGACTCAGAAATGTGCCAGCTATATCGAATAGAGGATTGTTCCGGAGCAATTGCA
GGGTTTCATAGAAGGAGGCTGGCCAGGTTTAATCAATGGTTGGTACGGTTTTTCAGCATCAAAATGAACAGG
GAACAGGAATAGCTGCAGACAAAGAATCAACACAGAAAGCTATAGACCAGATAACAACCAAAATAAATAA
CATTATTGATAAAATGAATGGGAATATGATTCAATTAGGGGTGAATTCAATCAAGTTGAGAAGCGTATA
AACATGCTTGCAGACAGAATAGATGATGCCGTGACGGACATTTGGTCATACAATGCCAACTTCTTGTAT
TGCTGGAAAATGATAAACTTTAGATATGCATGATGCTAATGTAAAGAATTTACATGAGCAAGTACGAAG
AGAATTGAAGGACAATGCAATTGACGAAGGAAATGGCTGTTTTGAACTCCTTCATAAATGCAATGACTCC
TGCATGGAACTATAAGAAATGGAACGTATGACCACACTGAGTATGCAGAGGAGTCAAAGTTAAAGAGGC
AAGAAATCGATGGCATCAAATCAAATCAGAAGACAACGTTTACAAAGCATTATCAATATACAGTTGCAT
TGCAAGTAGTGTGTACTAGTAGGACTCATACTCTCTTCATCATGTGGGCCTGTAGTAGTGGGAATTGC
CGATTCAATGTTTTGTATATAA

Fig. 10L

Subtype H14 (SEQ ID NO:23)

>gi|324045|gb|M35997.1|FLAH1424 Influenza A/Mallard/Gurjev/263/82
hemagglutinin subtype H14 gene

AGCAAAAGCAGGGGAAAATGATTGCACTCATATTGGTTGCACTGGCTCTGAGCCACACTGCTTATTCTCA
GATCACAAATGGGACAACAGGAAACCCCATATATGCTTGGGGCATCATGCAGTGGAAAACGGCACATCT
GTTAAAACACTAACAGACAATCACGTAGAAGTTGTGTGCTAGCTAAAGAATTAGTTGAGACGAACCACACTG
ATGAACTGTGCCAAGCCCTTGAAGCTTGTGACGGGCAAGACTGCCACCTCATCAATGGTGCATTGGG
GAGTCCAGGCTGTGACCGTTTGCAGGACACCACTTGGGATGTCTTCATTGAAAGGCCCACTGCAGTAGAC
ACATGTTATCCATTGACGTCCAGATTACCAGAGTCTCAGAAGCATCCTAGCAAGCAGTGGGAGTTTGG
AGTTCATCGCCGAACAATTCACCTGGAATGGTGTCAAAGTTGACGGATCAAGCAGTGCTTGTGTTGAGGGG
CGGTGCAACAGCTTCTTCTCCCGACTAACTGGCTAACCAGCAACAATGGAACTATGGACCTATT
AACGTCACTAAAGAAAATACGGGCTCTTATGTGCTAGGCTCTATCTCTGGGGAGTGCATCACCCTCAAGCG
ATAATGAGCAAACGGATCTCTACAAGGTGGCAACAGGGAGAGTAACAGTATCTACCCGCTCGGACCAAAT
CAGTATTGTTCCCAATATAGGAAGTAGACCGAGGGTAAGGAATCAGAGCGGCAGGATAAGCATCTACTGG
ACCCTAGTAAACCCAGGGGACTCCATCATTTTCAACAGTATTGGGAATTTGATTGCACCAAGAGGCCACT
ACAAAATAAGCAAATCTACTAAGAGCACAGTGCTTAAAAGTGACAAAAGGATTGGGTCATGCACAAGCCC
TTGCTTAACTGATAAAGGTTGATCCAAAGTGACAAACCTTTTCAGAATGTATCAAGGATTGCTATAGGA
AACTGCCCAGAAATATGTAAAGCAAGGGTCCCTGATGTTAGCAACTGGAATGCGCAACATCCCTGGCAAAC
AGGCAAAGGGCTTATTTGGGGCAATTGCTGGATTCAATTGAAAATGGTTGGCAAGGCCTGATTGATGGGTG
GTATGGATTCAAGGCACCAAATGCTGAAGGAACAGGAAGTCTGCAGACCTGAAGTCAACTCAGGCAGCC
ATTGATCAGATAAATGGCAAGCTGAACAGATTGATAGAGAAGACAAATGAAAAATATCACCAAATAGAAA
AGGAATTCGAACAGGTGGAAGGAAGAATACAAGACCTTGAGAAGTACGTTGAGGACACTAAGATTGATTT
GTGGTCATACAATGCTGAATTGCTAGTAGCACTAGAGAATCAGCACACAATAGATGTCACAGACTCCGAA
ATGAACAAGCTTTTTGAAAGAGTAAGAAGGCAATTAAGAGAGAATGCAGAAGATCAAGGCAACGGTTGTT
TCGAGATATTCCATCAGTGTGACAACAATTGTATAGAAAGCATTAGAAACGGAACCTTATGACCACAACAT
CTACAGGGATGAAGCCATCAACAATCGAATCAAAATAAATCCTGTCACCTTGACGATGGGGTACAAGGAC
ATAATCCTGTGGATTTCTTTCTCCATGTCATGCTTTGTCTTCGTGGCACTGATTCTGGGATTTGTTCTAT
GGGCTTGTCAAAACGGGAATATCCGATGCCAAATCTGTATATAAAGAAAAAACCCCTTGTCTTCTACTC

Fig. 10M

Subtype H15 (SEQ ID NO:24)

>gi|1226068|gb|L43916.1|FLAHMAC Influenza A/duck/Australia/341/83 (H15N8) hemagglutinin mRNA, complete cds

AGCAAAAGCAGGGGATACAAATGAACACTCAAATCATCGTCATTCTAGTCCTCGGACTGTCGATGGTGA
GATCTGACAAGATTGTCTCGGGCACCATGCCGTAGCAAATGGGACAAAAGTCAACACACTAACTGAGAA
AGGAGTGGAAGTGGTCAATGCCACGGAGACAGTGGAGATTACAGGAATAAATAAAGTGTGCACAAAAGGG
AAGAAAGCGGTGGACTTGGGATCTTGTGGAATACTGGGAACATCATTGGGCCTCCACAATGTGACTCTC
ATCTTAAATTCAAAGCTGATCTGATAATAGAAAGAAGAAATTCAAGTGACATCTGTTACCCAGGGAAATT
CACTAATGAGGAAGCACTGAGACAAATAATCAGAGAATCTGGTGGAATTGACAAAGAGCCAATGGGATTT
AGATATTTCAGGAATAAAAACAGACGGGGCAACCAGTGCCTGTAAGAGAACAGTGTCTCTTTCTACTCAG
AAATGAAATGGCTTTTATCCAGCAAGGCTAACCAGGTGTTCCCACTGAATCAGACATACAGGAACAA
CAGAAAAGAACCAGCCCTAATTGTTTGGGGAGTACATCATTCAAGTTCCTTGGATGAGCAAAATAAGCTA
TATGGAGCTGGGAACAAGCTGATAACAGTAGGAAGCTCAAATACCAACAATCGTTTTCACCAAGTCCAG
GGGACAGGCCCAAAGTGAATGGTCAGGCCGGGAGGATCGACTTTCATTGGATGCTATTGGACCCAGGGGA
TACAGTCACTTTTACCTTCAATGGTGCATTATAGCCCCAGATAGAGCCACCTTTCTCCGCTCTAATGCC
CCATCGGGAGTTGAGTACAATGGGAAGTCACTGGGAATACAGAGTGATGCACAAATTGATGAATCATGTG
AAGGGGAATGCTTCTACAGTGGAGGGACAATAAACAGCCCTTTGCCATTTCAAACATCGATAGTTGGGC
TGTCGGAAGGTGCCCCAGATATGTAAAGCAATCAAGCCTGCCGCTGGCCTTAGGAATGAAAAATGTACCA
GAGAAAATACATACTAGGGGACTGTTCCGGTGCAATTGCAGGATTCATCGAGAATGGATGGGAAGGACTCA
TTGATGGATGCTATGGATTTAGGCATCAAAATGCACAGGGGCAGGGAACAGCTGCTGACTACAAGAGTAC
TCAGGCTGCAATTGACCAGATAACAGGGAACTTAATAGATTAATTGAAAAAACCAACACACAGTTTGAA
CTCATAGACAATGAGTTCCTGAAGTGGAGCAGCAGATAGGCAATGTAATAAACTGGACAAGGGACTCCT
TGACTGAGATCTGGTCATACAATGCTGAACCTTCTAGTAGCAATGGAATAATCAGCATACAATTGACCTTGC
AGATTCTGAAATGAACAACTCTATGAGAGAGTGAGAAGACAGCTAAGGGAGAATGCCGAGGAGGATGGA
ACTGGATGTTTTGAGATTTTCCACCGATGTGACGATCAATGTATGGAGAGCATACGAAATAATACTTACA
ATCACACTGAATATCGACAGGAAGCCTTACAGAATAGGATAATGATCAATCCGGTAAAGCTTAGTGGTGG
GTACAAAGATGTGATACTATGTTTAGCTTCGGGGCATCATGTGTAATGCTTCTAGCCATTGCTATGGGT
CTTATTTTCATGTGTGTGAAAAACGGGAATCTGCGGTGCACTATCTGTATATAATTATTTGAAAAACACC
CTTGTCTTCTACT

Fig. 10N

Subtype H16 (SEQ ID NO:25)

>gi|56425020|gb|AY684891.1| Influenza A virus (A/black-headed gull/Sweden/5/99(H16N3)) hemagglutinin (HA) gene, complete cds

```
AGCAAAAGCAGGGGATATTGTCAAAACAACAGAATGGTGATCAAAGTGCTCTACTTTCTCATCGTATTGT
TAAGTAGGTATTCGAAAGCAGACAAAATATGCATAGGATATCTAAGCAACAACGCCACAGACACAGTAGA
CACACTGACAGAGAACGGAGTTCCAGTGACCAGCTCAGTTGATCTCGTTGAAACAAACCACACAGGAACA
TACTGCTCACTGAATGGAATCAGCCCAATTCATCTTGGTGACTGCAGCTTTGAGGGATGGATCGTAGGAA
ACCCCTTCCTGTGCCACCAACATCAACATCAGAGAGTGGTTCGTATCTAATTGAGGACCCCAATGCCCCAA
CAAACCTCTGCTTCCCAGGAGAGTTAGATAATAATGGAGAATTACGACATCTCTTCAGCGGAGTGAACCTCT
TTTAGCAGAACAGAATTAATAAGTCCCAACAAATGGGGGAGACATTCTGGATGGAGTCACCGCTTCTTGCC
GCGATAATGGGGCAAGCAGTTTTTACAGAAATTTGGTCTGGATAGTGAAGAATAAAAAATGGAAAATACCC
TGTCATAAAGGGGATTACAATAACACAACAGGCAGAGATGTTCTAGTACTCTGGGGCATTACCCATCCG
GATACAGAAAACAACAGCCATAAACTTGTACGCAAGCAAAAACCCCTACACATTAGTATCAACAAAGGAAT
GGAGCAAAAGATATGAACTAGAAATTGGCACCAGAATAGGTGATGGACAGAGAAGTTGGATGAAACTATA
TTGGCACCTCATGCGCCCTGGAGAGAGGATAATGTTTGAAAGCAACGGGGGCCTTATAGCGCCAGATAC
GGATACATCATTTGAGAAGTACGGTACAGGACGAATTTTCCAAAGTGGAGTGAGAATGGCCAAATGCAACA
CAAAGTGTCAAACATCATTAGGTGGGATAAACACCAACAAAACCTTTCCAAACATAGAGAGAAATGCTCT
TGGAGATTGCCCCAAAGTACATAAAGTCTGGACAGCTGAAGCTTGCAACTGGGCTGAGAAATGTCCCATCC
GTTGGTGAAAGAGGTTTGTGTTGGTGCAATTGCAGGCTTCATAGAAGGAGGGTGGCCTGGGCTAATTAATG
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AGCGATAGATGAAATAACAACAAAAATTAACAATATAATAGAGAAGATGAACGGAAACTATGATTCAATA
AGAGGGGAATTCATCAAGTAGAAAAGAGGATCAACATGCTCGCTGATCGAGTTGATGATGCAGTAACTG
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AAATGTCAGGAACCTTACACGATCAGGTCAAGAGAATATTGAAAAGTAATGCTATTGATGAAGGAGATGGT
TGCTTCAATCTTCTTCACAAATGTAATGACTCATGCATGGAACTATTAGAAATGGGACCTACAATCATG
AAGATTACAGGGAAGAATCACAACGAAAAGGCAGGAAATTGAGGGAATAAAATTGAAGTCTGAAGACAA
TGTGTATAAAGTACTGTGATTTATAGCTGCATTGCAAGCAGTATTGTGCTGGTAGGTCTCATACTTGCG
TTCATAATGTGGGCATGCAGCAATGGAAATTGCCGGTTTAATGTTGTATATAGTCGGAAAAAATACCCCT
TGTTTCTACT
```

Fig. 100

Influenza B (SEQ ID NO:26)

>gi|325175|gb|K00423.1|FLBHAZO Influenza B/Lee/40, hemagglutinin (seg 4), complete segment

AGCAGAAGCGTTGCATTTTCTAATATCCACAAAATGAAGGCAATAATTGTACTACTCATGGTAGTAACAT
CCAATGCAGATCGAATCTGCACTGGGATAACATCGTCAAACCTCACCTCATGTGGTTAAACTGCCACTCA
AGGGGAAGTCAATGTGACTGGTGTGATACCACTAACAACAACACCTACCAAATCTCATTTTGCAAATCTC
AAAGGAACACAGACCAGAGGAAAACCTATGCCCAAACCTGTTTTAACTGCACAGATCTGGACGTGGCCCTAG
GCAGACCAAATGCATGGGGAACACACCCCTCCGCAAAAGTCTCAATACTCCATGAAGTCAAACCTGCTAC
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GAAAACATCAGGTTATCAACCAGTAATGTTATCAATACAGAGACGGCACCAGGAGGACCCTACAAGGTGG
GGACCTCAGGATCTTGCCCTAACGTTGCTAATGGGAACGGCTTCTTCAACACAATGGCTTGGGTTATCCC
AAAAGACAACAACAAGACAGCAATAAATCCAGTAACAGTAGAAGTACCATACATTTGTTTCAGAAGGGGAA
GACCAAATTACTGTTTGGGGGTTCCTACTCTGATGACAAAACCCAAATGGAAAGACTCTATGGAGACTCAA
ATCCTCAAAAGTTCACCTCATCTGCCAATGGAGTAACCACACATTATGTTTCTCAGATTGGTGGCTTCCC
AAATCAAACAGAAGACGAAGGGCTAAAACAAAGCGGCAGAATTGTTGTTGATTACATGGTACAAAACCT
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GGAGCAAGGTAATAAAAGGGTCCTTGCTTTAATTGGTGAAGCAGATTGCCTCCACGAAAAGTACGGTGG
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AAAACACCCCTTGAAGCTGGCCAATGGAACCAATATAGACCGCTGCAAACTATTAAAGGAAAGAGGTT
TCTTCGGAGCTATTGCTGGTTTCTTGGAAGGAGGATGGGAAGGAATGATTGCAGGTTGGCACGGATACAC
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GAAAGAAAACCTGAAGAAAATGCTTGGCCCTCTGCTGTAGAAATAGGGAATGGGTGCTTTGAAACCAAAC
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CACTTTTGATTCACTAAACATTACTGCTGCATCTTTAAATGATGATGGCTTGGATAATCATACTATACTG
CTCTACTACTCACTGCTGCTTCTAGCTTGGCTGTAACATTAATGATAGCTATCTTCATTGTCTACATGG
TCTCCAGAGACAATGTTTCTTGTTCATCTGTCTGTGAGGGAGATTAAGCCCTGTGTTTTCTTTACTGT
AGTGCTCATTTGCTTGTCAACATTACAAAGAAACGTTATTGAAAAATGCTCTTGTTACTACT

Fig. 10P

Influenza C (SEQ ID NO:27)

```
>gi|325317|gb|M17868.1|FLCHAJ0 Influenza C/Johannesburg/66
hemagglutinin esterase RNA (seg 4), complete cds
AGCAGAAGCAGGGGGTTAATAATGTTTTCTCATTACTCTTGGTGTGGGCCTCACAGAGGCTGAAAAAA
TAAAGATATGCCTTCAAAGCAAGTGAACAGTAGCTTCAGCCTACACAATGGCTTCGAGGAAATTTGTA
TGCCACAGAAGAAAAAGAATGTTTGAGCTTGTTAAGCCCAAAGCTGGAGCCTCTGTCTTGAATCAAAGT
ACATGGATTGGCTTTGGAGATTCAAGGACTGACAAAAGCAATTCAGCTTTTCCTAGGTCTGCTGATGTTT
CAGCAAAACTGCTGATAAGTTTCGTTTTTGTCTGGTGGATCCTTAATGTTGAGTATGTTTGGCCCACC
TGCGAAGGTAGACTACCTTTACCAAGGATGTGGAAAACATAAAGTTTTTTATGAAGGAGTTAACTGGAGT
CCACATGCTGCTATAAATTGTTACAGAAAAAATTGGACTGATATCAAATGAATTTCCAGAAAAACATTT
ATGAATTGGCTTCACAATCACATTGCATGAGCTTGGTGAATGCCTTGGACAAAACATTCCTTTACAAGT
GACTGCTGGGACTGCAGGAAATTGCAACAACAGCTTCTTAAAAAATCCAGCATTGTACACACAAGAAGTC
AAGCCTTCAGAAAACAAATGTGGGAAAGAAAAATCTTGCTTTCTTCACACTTCCAACCCAATTTGGAACCT
ATGAGTGCAACTGCATCTTGTGGCTTCTTGCTATTTTCATCTATGATAGTAAAGAAGTGTACAATAAAG
AGGATGTGACAACTACTTTCAAGTGATCTATGATTCAATTTGGAAAAGTCGTTGGAGGACTAGATAACAGG
GTATCACCTTACACAGGGAATTCGGAGACACCCCAACAATGCAATGTGACATGCTCCAGCTGAAACCTG
GAAGATATTCAGTAAGAAGCTCTCCAAGATTCCCTTTAATGCCTGAAAGAAGTTATTGCTTTGACATGAA
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CAAGCTTGCTTGAGCACTCCAGGGTGCATGTTGATCCAAAAGCAAAGCCATACATTGGAGAAGCTGATG
ATCACCATGGAGATCAAGAAATGAGGGAGTTGCTGTGAGGACTGGACTATGAAGCTAGATGCATATCACA
ATCAGGGTGGGTGAATGAAACCAGTCCTTTTACGGAGAAATACCTCCTTCCTCCCAAATTTGGAAGATGC
CCTTTGGCTGCAAAGGAAGAATCCATTCAAAAAATCCCAGATGGCCTTCTAATTTCCACCAGTGGAACCG
ATACCACTGTAACCAACCTAAGAGCAGAAATTTTGGAAATCGATGACCTCATTATTGGTGTGCTCTTTGT
TGCAATCGTTGAAACAGGAATTGGAGGCTATCTGCTTGGAAGTAGAAAAGAATCAGGAGGAGGTGTGACA
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TCGCAATAGAAAACTAAATGACAGAATTTCTCATGATGAGCAAGCCATCAGAGATCTAACTTTAGAAAT
TGAAAATGCAAGATCTGAAGCTTTATTGGGAGAATTGGGAATAATAAGAGCCTTATTGGTAGGAAATATA
AGCATAGGATTACAGGAATCTTTATGGGAACTAGCTTCAGAAATAACAAATAGAGCAGGAGATCTAGCAG
TTGAAGTCTCCCCAGGTTGCTGGATAATTGACAATAACATTTGTGATCAAAGCTGCAAAATTTTATTTT
CAAGTTCAACGAACTGCACCTGTTCCAACCATTCCTTCTTGACACAAAATTTGATCTGCAATCAGAT
CCTTTTTACTGGGGAAGCAGCTTGGGCTTAGCAATAACTGCTACTATTTTCATTGGCAGCTTTGGTGATCT
CTGGGATCGCCATCTGCAGAACTAAATGATTGAGACAATTTTGAAAATGGATAATGTGTTGGTCAATAT
TTGTACAGTTTTATAAAAAACAAAAATCCCTTGCTACTGCT
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Fig. 10Q

SEQ ID NO: 29

5'-AGTTCCCCGGGCTGGTATATTTATATGTTGTC-3'**Fig. 10 R**

SEQ ID NO: 30

5'-AATAGGAGCTCCATTTTCTCTCAAGATGATTAATTAATTAATTAGTC-3**Fig. 10S**

SEQ ID NO: 31

5'-AATAGGAGCTCGTAAAAATGCTTCTTCGTCTCCTATTTATAATATGG-3'**Fig. 10T**

SEQ ID NO: 32

5'-
TTACGAATTCTCCTTCCTAATTGGTGTACTATCATTTATCAAAGGGGA-3'

Fig. 11

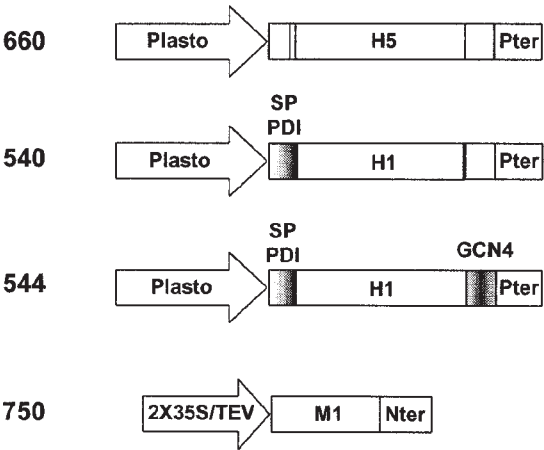
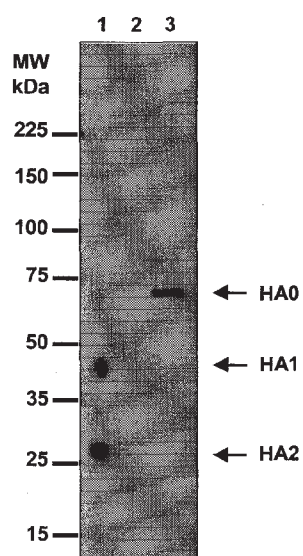
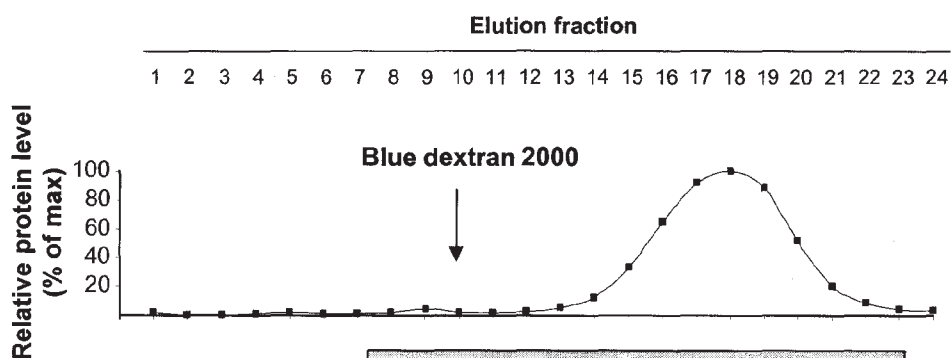


Fig. 12

1- Commercial H5 (A/Vietnam/1203/2004) (750 ng)

2- Leaf protein extract from mock (37.5 μ g)

3- Leaf protein extract from R660-infiltrated plant (37.5 μ g)

Fig. 13A**Fig. 13B**

H5

Fig. 13C

H1

Fig. 13D

soluble H1

Fig. 13E

H1 rosette

Fig. 13F

H1+M1

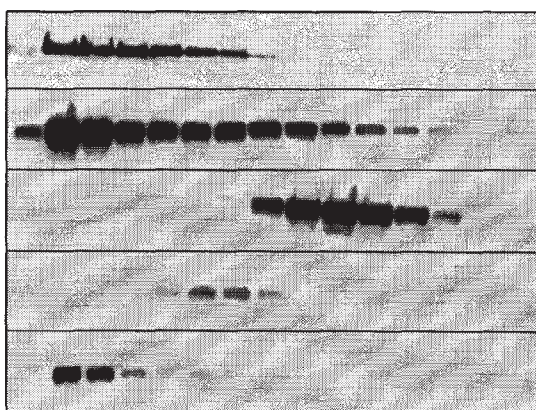


Fig.14A

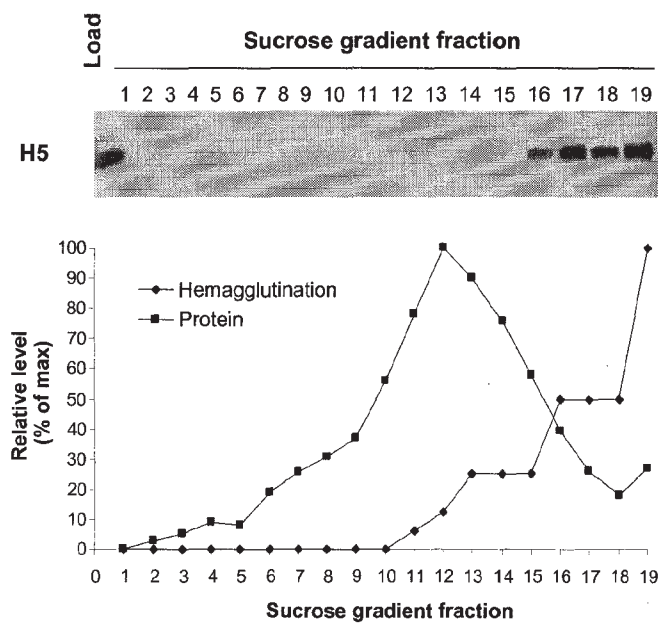


Fig. 14B

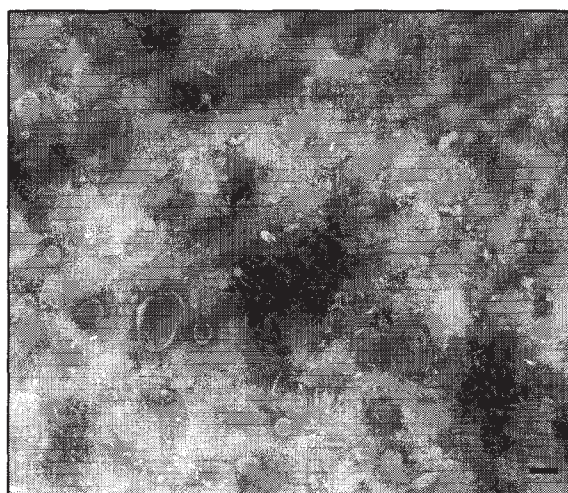


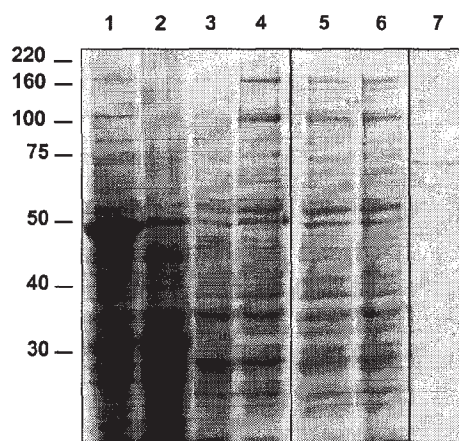
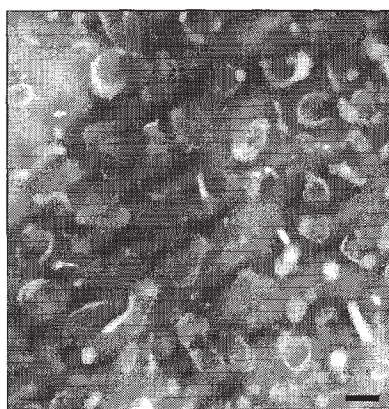
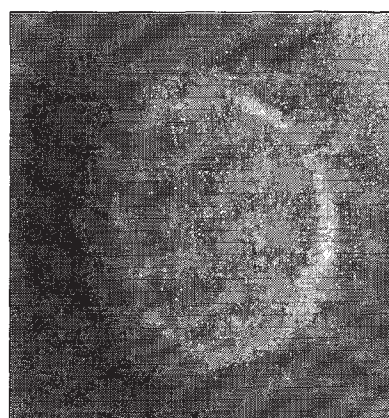
Fig. 15A**Fig. 15B****Fig. 15C**

Fig. 15D

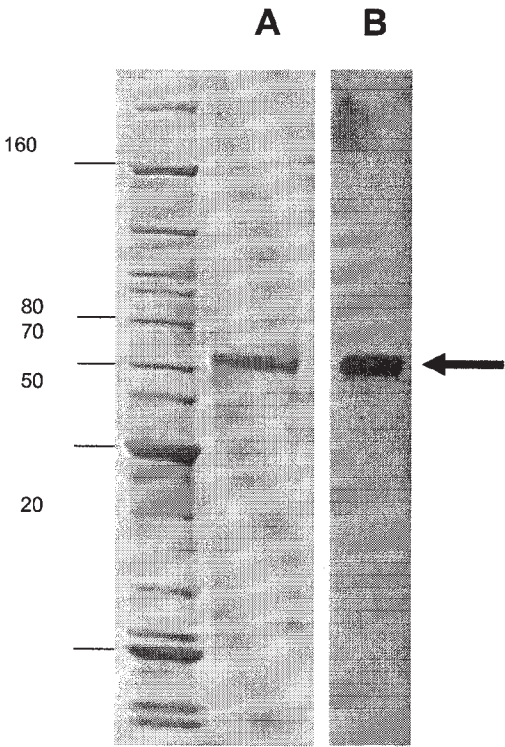


Fig. 16

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CACAATGGAAAACCTATGTCTACTAAAAGGAATAGCCCCACTACAATTGGGTAA
TTGCAGCGTTGCCGGATGGATCTTAGGAAACCCAGAATGCGAATTACTGATTT
CCAAGGAATCATGGTCCTACATTGTAGAAACACCAAATCCTGAGAATGGAACA
TGTTACCCAGGGTATTTGCGCCGACTATGAGGAACTGAGGGAGCAATTGAGTTC
AGTATCTTCATTTGAGAGATTGCGAAATATTCCCCAAAGAAAGCTCATGGCCCA
ACCACACCGTAACCGGAGTATCAGCATCATGCTCCCATAATGGGAAAAGCAGT
TTTTACAGAAATTTGCTATGGCTGACGGGGAAGAATGGTTTGTACCCAAACCT
GAGCAAGTCCTATGTAAACAACAAAGAGAAAGAAGTCCTTGTACTATGGGGTG
TTCATCACCCGCCTAACATAGGGAACCAAAGGGCCCTCTATCATAAGAAAAT
GCTTATGTCTCTGTAGTGTCTTCACATTATAGCAGAAGATTCACCCAGAAAT
AGCCAAAAGACCCAAAGTAAGAGATCAGGAAGGAAGAATCAACTACTACTGGA
CTCTGCTGGAACCTGGGGATACAATAATATTTGAGGCAAATGGAAATCTAATA
GCGCCATGGTATGCTTTTGCAGTGTAGAGGCTTTGGATCAGGAATCATCAC
CTCAAATGCACCAATGGATGAATGTGATGCGAAGTGTCAAACACCTCAGGGAG
CTATAACAGCAGTCTTCCTTTCCAGAATGTACACCCAGTCACAATAGGAGAG
TGTCCAAAGTATGTCAGGAGTGCAAAATTAAGGATGGTTACAGGACTAAGGAA
CATCCCATCCATTCAATCCAGAGGTTTGTGGAGCCATTGCCGGTTTCATTG
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GGTTCTACTGGAAAATGAAAGGACTTTGGATTTCCATGACTCCAATGTGAAGA
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GAAAAATGGAACCTTATGACTATCCAAAATATTCCGAAGAATCAAAGTTAAACA
GGGAGAAAATTGATGGAGTGAAATTGGAATCAATGGGAGTCTATCAGATTCTG
GCGATCTACTCAACTGTCGCCAGTTCCCTGGTTCTTTTGGTCTCCCTGGGGGC
AATCAGCTTCTGGATGTGTTCCAATGGGTCTTTGCAGTGTAGAATATGCATCT
GAGACCAGAATTTCA

Fig. 17

SEQ ID NO: 34

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TTCGGTTTATTGTTTTCTCTTCTTCTGTTGGTTCCTTCTC**AGATCT**TTCGCTG
AGGAATCATCAACTGACGCTAAGGAATTTGTTCTTACATTGGATAACACTAA
TTTCCATGACACTGTTAAGAAGCACGATTTTCATCGTCGTTGAATTCTACGCA
CCTTGGTGTGGACACTGTAAGAAGCTAGCCCCAGAGTATGAGAAGGCTGCTT
CTATCTTGAGCACTCACGAGCCACCAGTTGTTTTGGCTAAAGTTGATGCCAA
TGAGGAGCACAACAAAGACCTCGCATCGGAAAATGATGTTAAGGGATTCCCA
ACCATTAAGATTTTTAGGAATGGTGGAAAGAACATTCAAGAATACAAAGGTC
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TTTGAATGCCAAACACCTTCCAAAGGGAGACTCATCAGTGTCTGGGCCTGTG
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TTCCAAAGCGATGCTGATGTTGTTATTGCAAACTGGATGCAACTGCCAACG
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TGAGCTTTGAAAAGTTCCGCTTGGAGGATATCGGCACACAGTCATCTGCGGG
CTTTACAACCTTTTTGTATCTCAGAATCAGAAGTTAGGAAATCTTAGTGCCA
ATCTATCTATTTTTGCGTTTCATTTTATCTTTTTGGTTTACTCTAATGTATT
ACTGAATAATGTGAGTTTTTGGCGGAGTTTAGTACTGGAACTTTTGTTTCTGT
AAAAAAAAAAAAA

Fig. 18

SEQ ID NO: 35

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AAGATGTCTTTGCAGGGAAGAACACCGATCTTGAGGTTCTCATGGAATGGCTAAA
GACAAGACCAATCCTGTCACCTCTGACTAAGGGGATTTTAGGATTTGTGTTACG
CTCACCGTGCCAGTGAGCGAGGACTGCAGCGTAGACGCTTTGTCCAAAATGCCC
TTAATGGGAACGGGGATCCAAATAACATGGACAAAGCAGTTAAACTGTATAGGAA
GCTCAAGAGGGAGATAACATTCCATGGGGCCAAAGAAATCTCACTCAGTTATTCT
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CCACTGAAGTGGCATTGTCCTGGTATGTGCAACCTGTGAACAGATTGCTGACTC
CCAGCATCGGTCTCATAGGCAAATGGTGACAACAACCAACCCACTAATCAGACAT
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GATCGAGTGAGCAAGCAGCAGAGGCCATGGAGGTTGCTAGTCAGGCTAGGCAAAT
GGTGCAAGCGATGAGAACCATTGGGACTCATCCTAGCTCCAGTGCTGGTCTGAAA
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Fig. 19

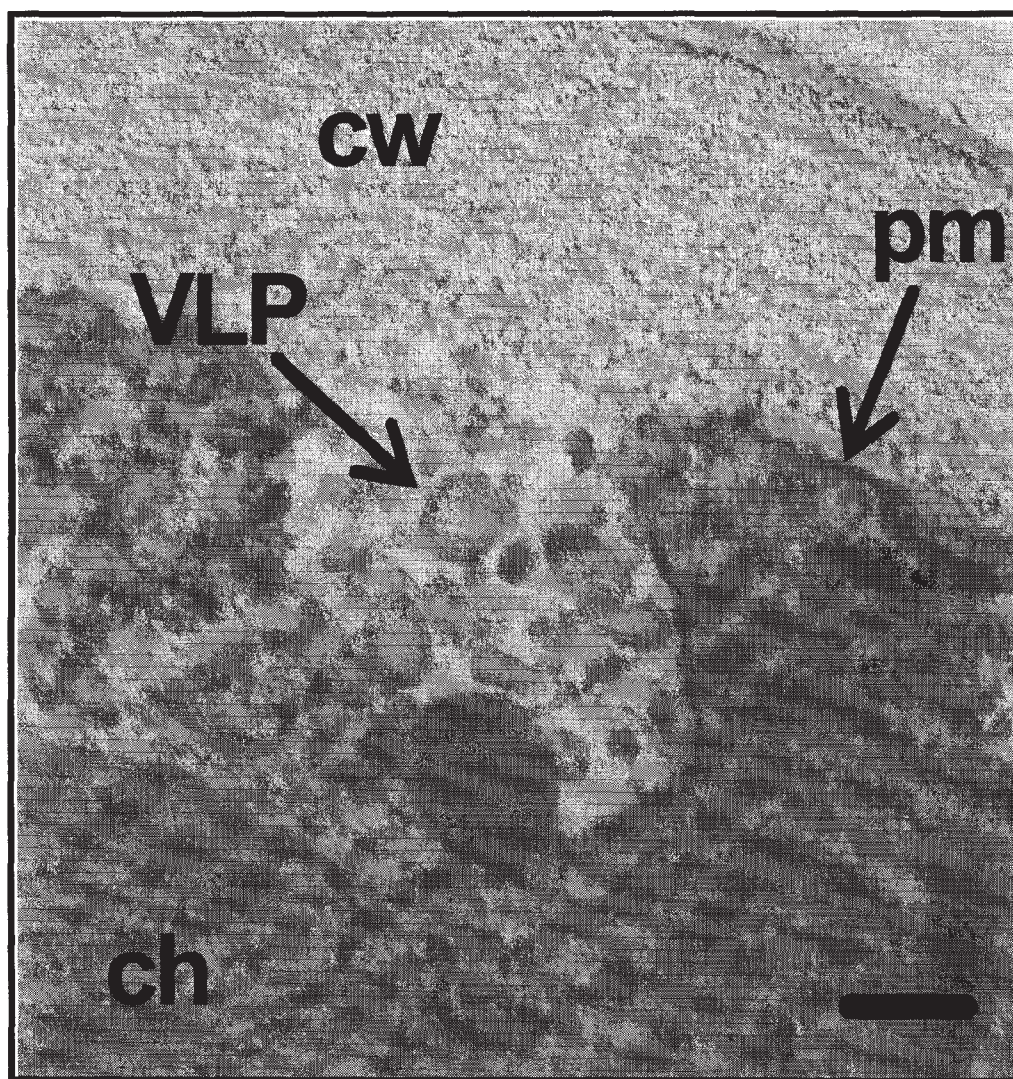


Fig. 20A

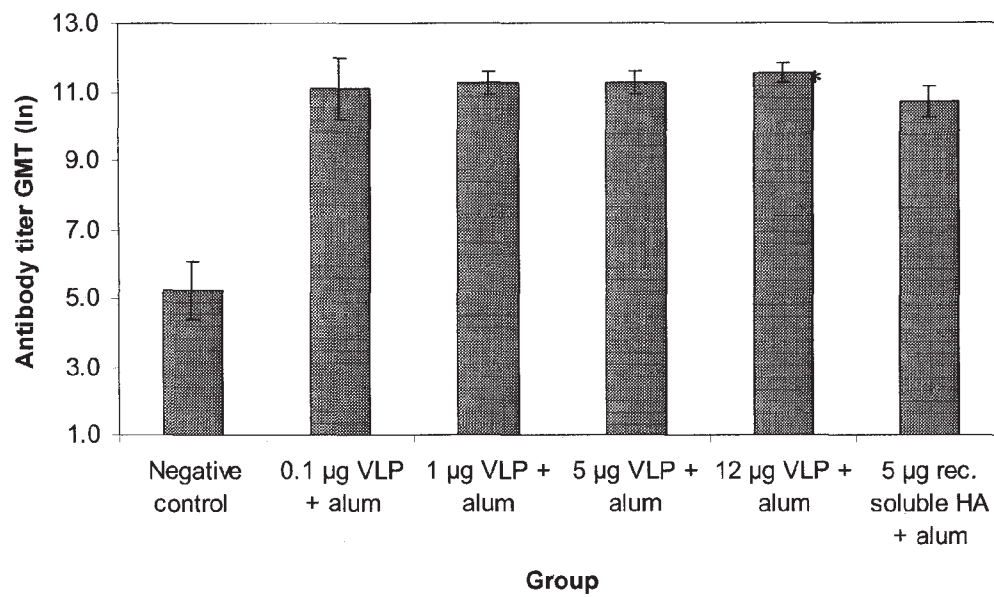


Fig. 20B

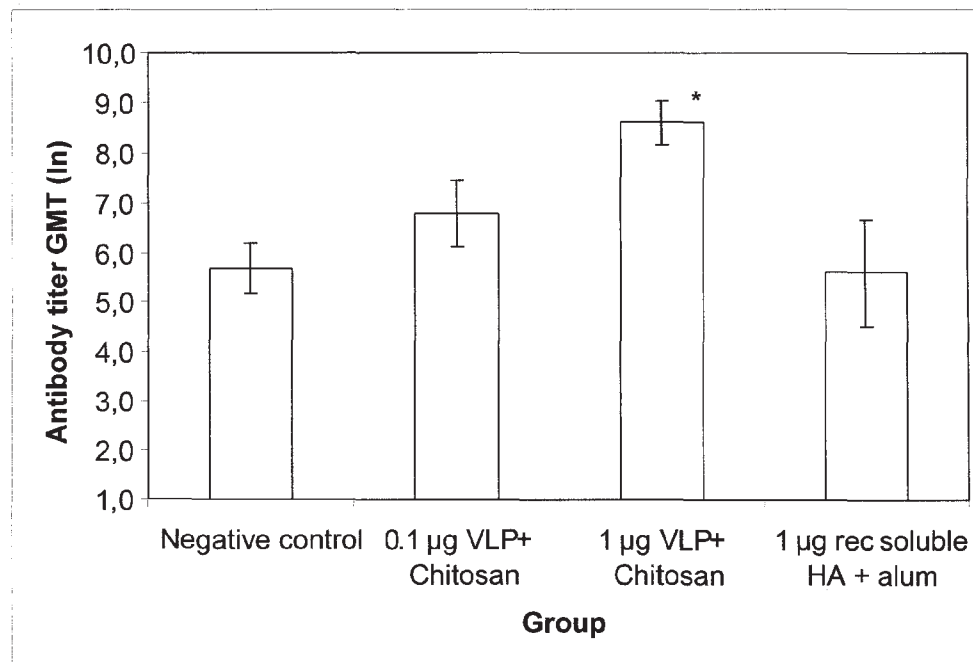


Fig. 21A

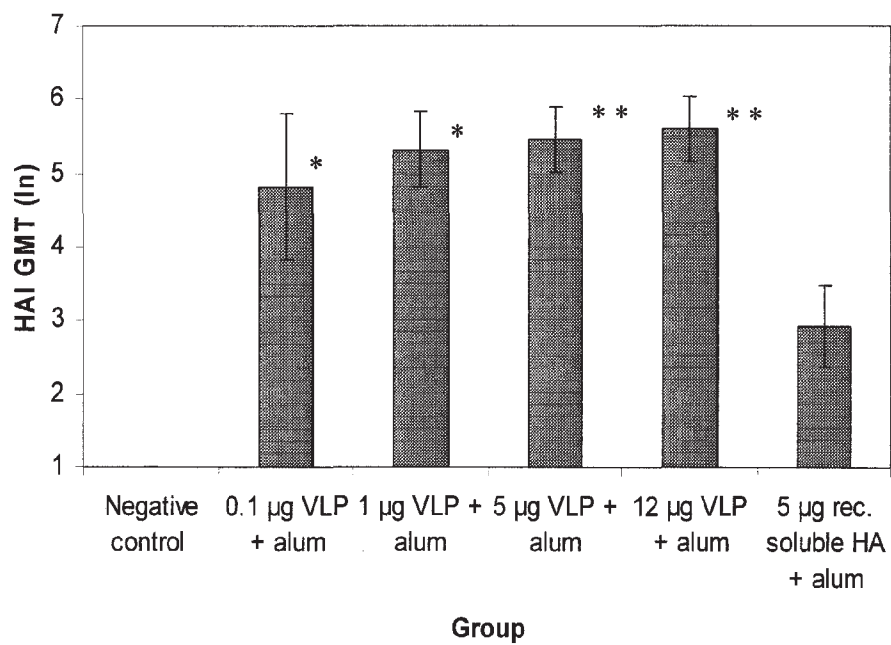


Fig. 21B

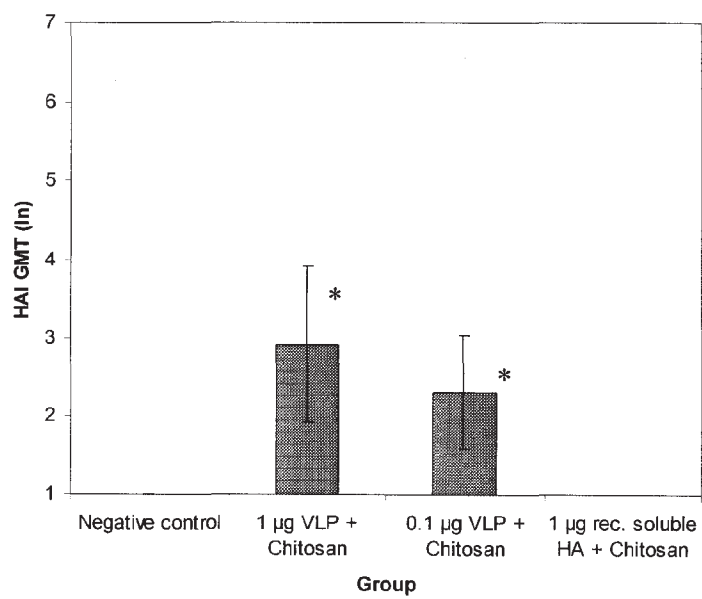


Fig. 22A

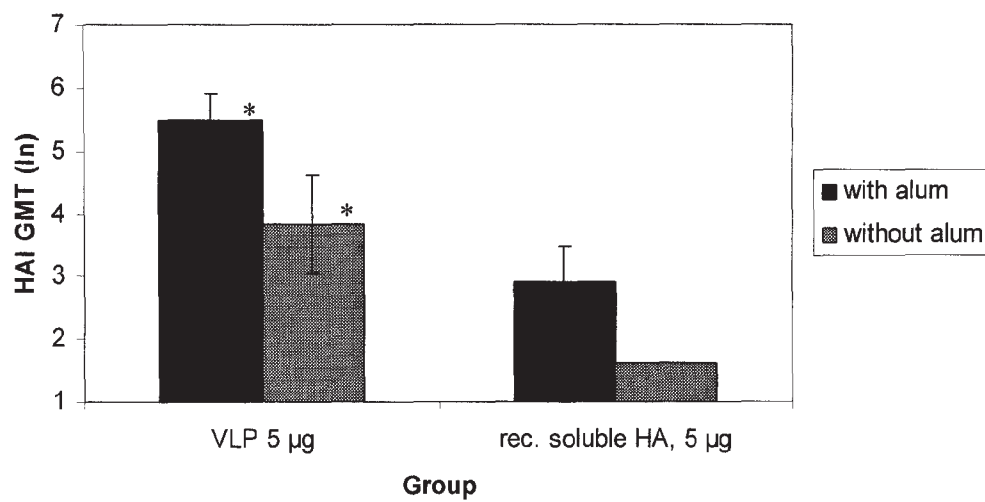


Fig. 22B

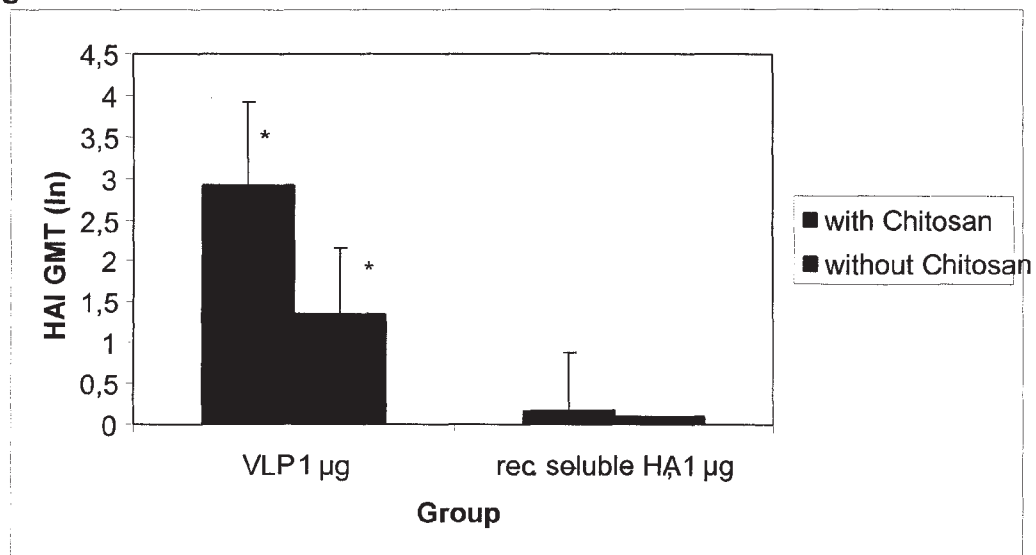


Fig. 23A

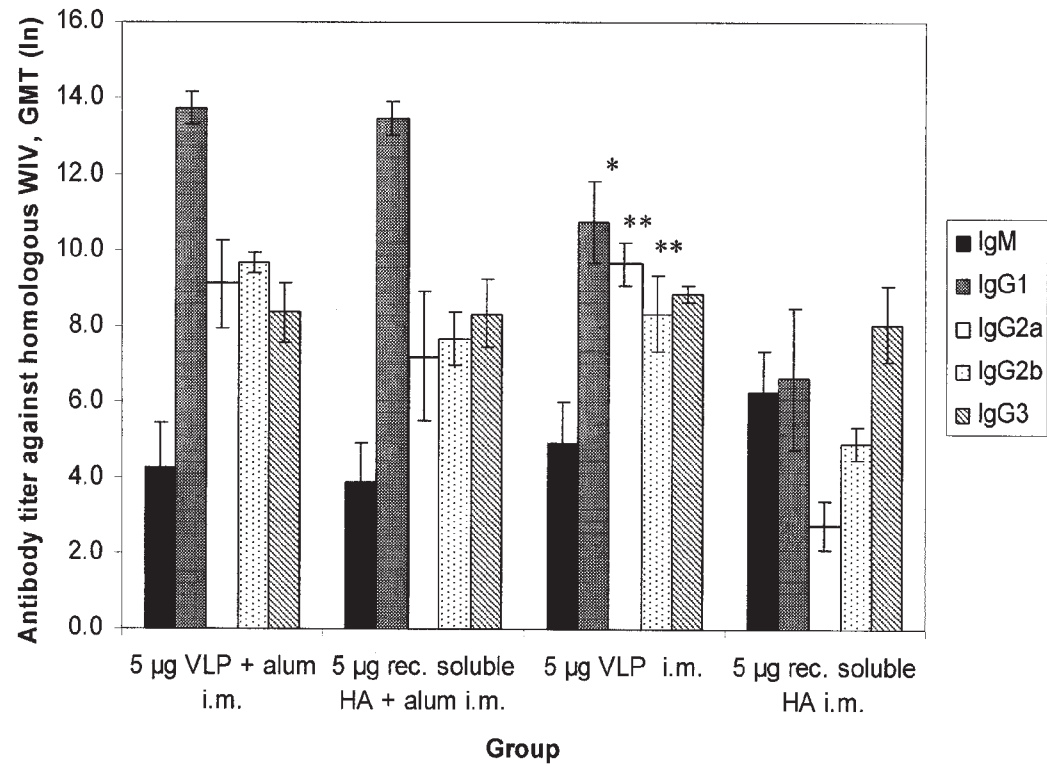


Fig. 23B

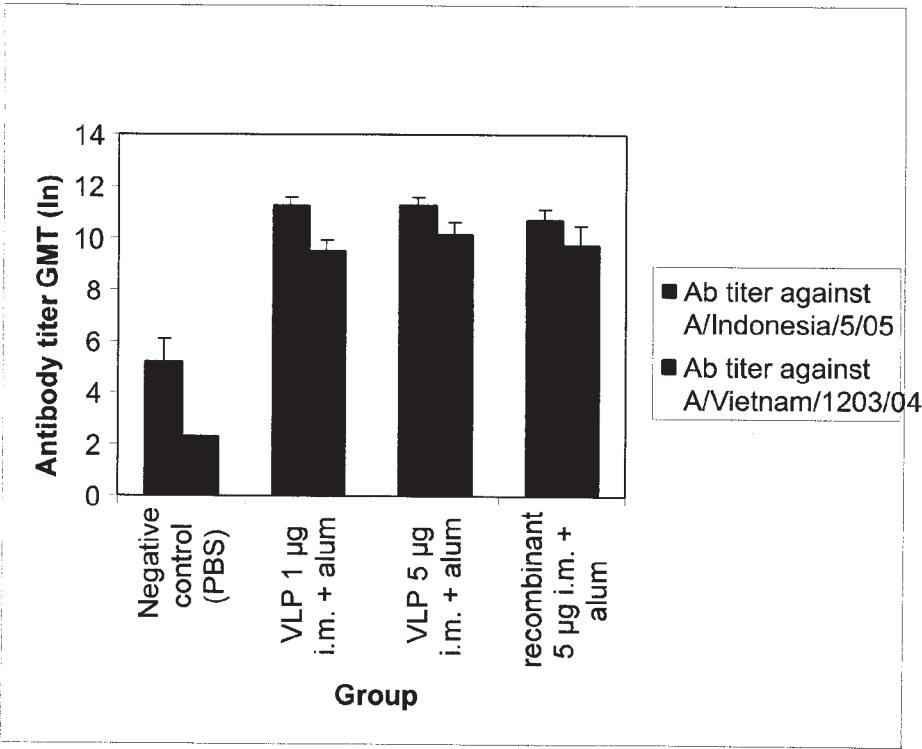
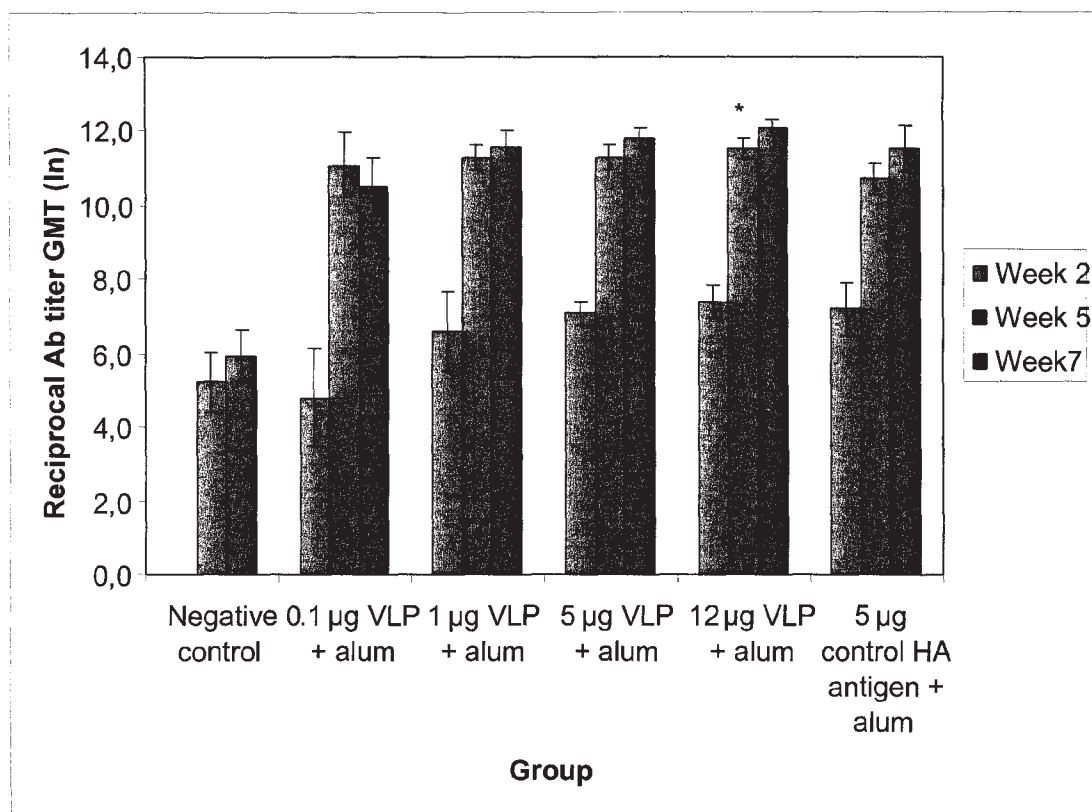


Fig. 24



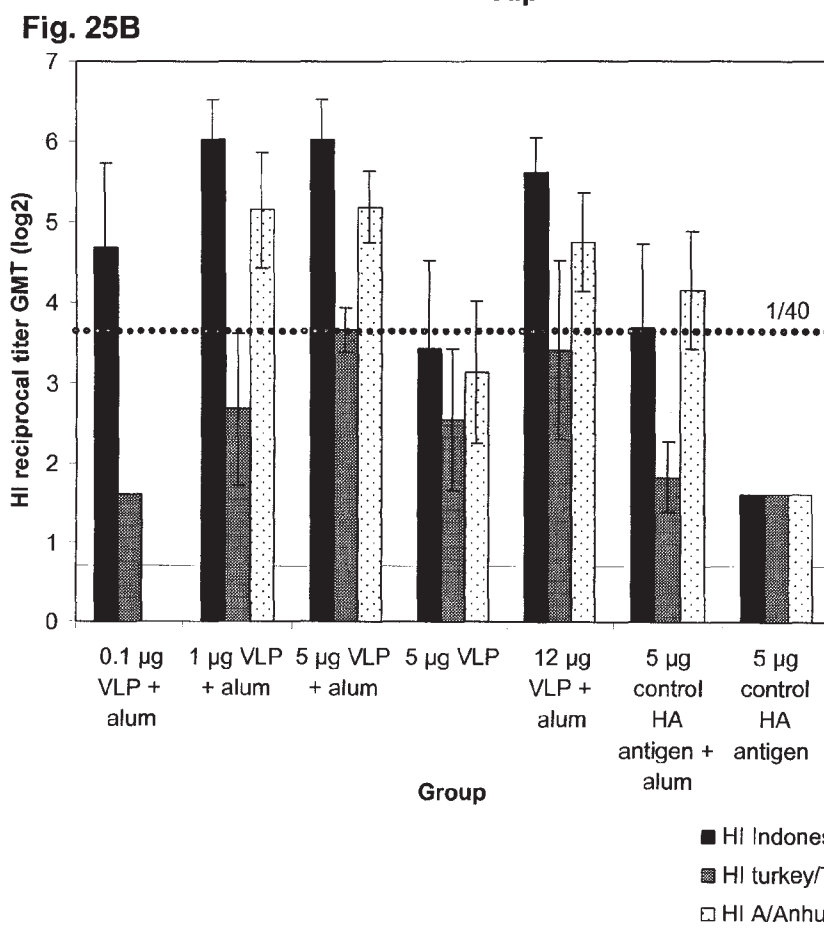
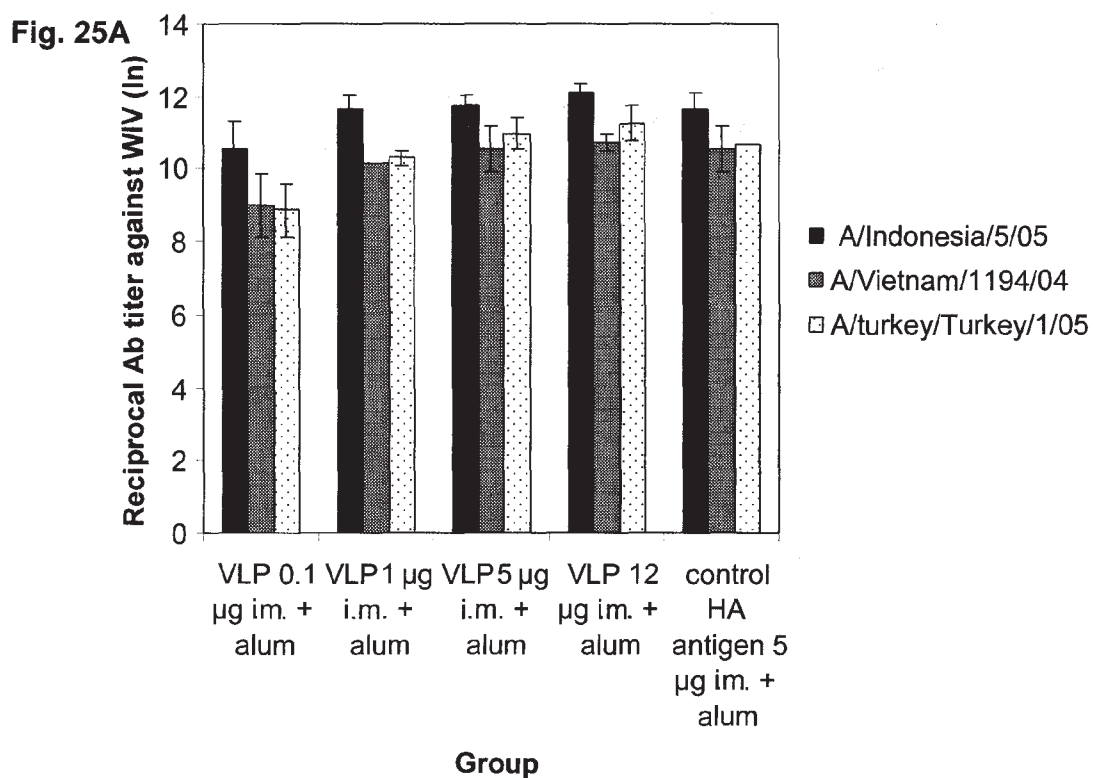


Fig. 26A

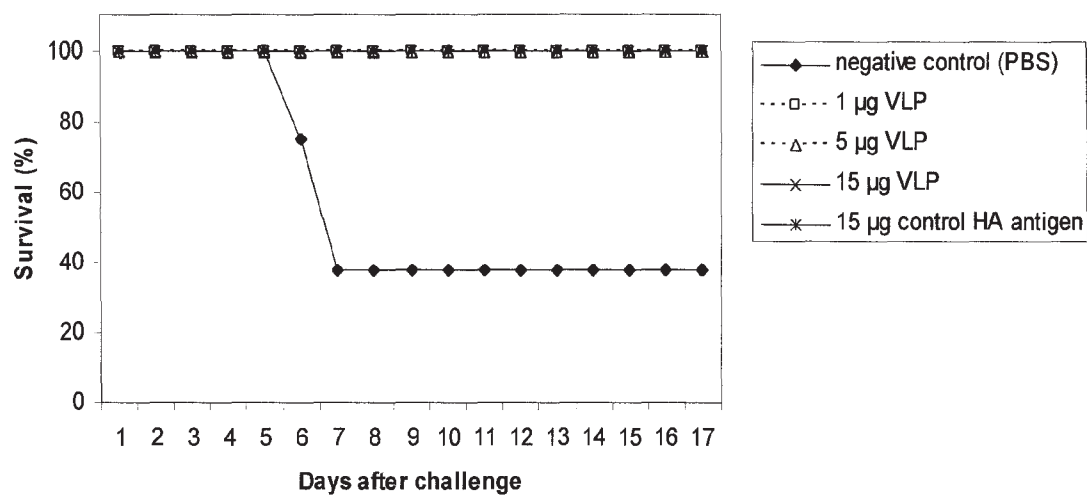


Fig. 26B

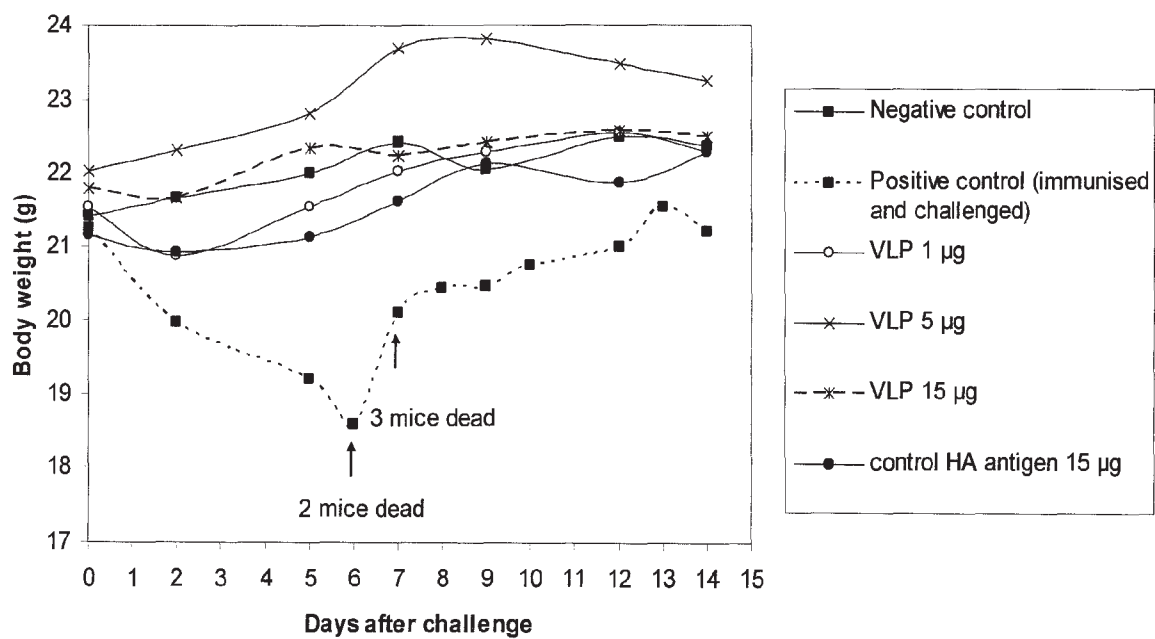


Fig. 27A

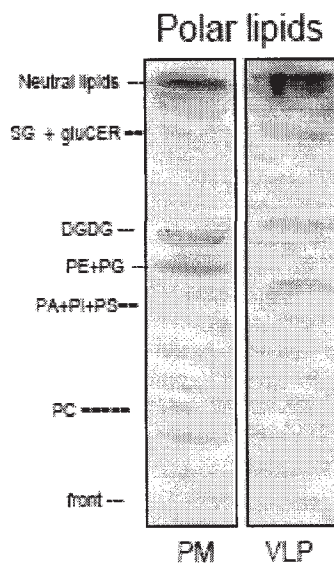


Fig. 27B

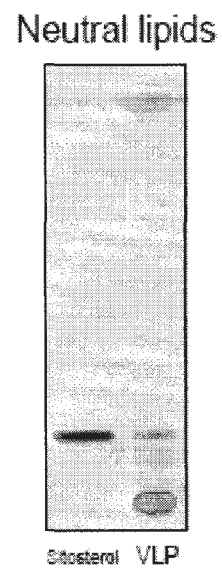


Fig. 27C

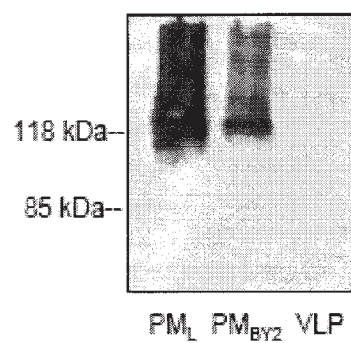


Fig. 28

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CTAATTAATTAATTAATCATCTTGAGAGAAAAATGAAAGTAAACTACTGGTCC
TGTTATGCACATTTACAGCTACATATGCAGACACAATATGTATAGGCTACCAT
GCTAACAACCTCGACCGACACTGTTGACACAGTACTTGAAAAGAATGTGACAG
TGACACACTCTGTCAACCTGCTTGAGAACAGTCACAATGGAAAACCTATGTCT
ATTAAAAGGAATAGCCCCACTACAATTGGGTAATTGCAGCGTTGCCGGGTG
GATCTTAGGAAACCCAGAATGCGAATTACTGATTTCCAAGGAGTCATGGTCC
TACATTGTAGAAAAACCAAATCCTGAGAATGGAACATGTTACCCAGGGCATT
TCGCTGACTATGAGGAACTGAGGGAGCAATTGAGTTCAGTATCTTCATTTGA
GAGGTTTCGAAATATTCCCCAAAGAAAGCTCATGGCCCAACCACACCGTAACC
GGAGTGTGAGCATCATGCTCCCATATGGGGAAAGCAGTTTTTACAGAAATT
TGCTATGGCTGACGGGGAAGAATGGTTTGTACCCAAACCTGAGCAAGTCCT
ATGCAAACAACAAAGAAAAAGAAGTCCTTGTACTATGGGGTGTTTCATCACCC
GCCAAACATAGGTGACCAAAGGCCCTCTATCATACAGAAAATGCTTATGTC
TCTGTAGTGTCTTCACATTATAGCAGAAAATTCACCCCAGAAATAGCCAAAAG
ACCCAAAGTAAGAGATCAAGAAGGAAGAATCAATTACTACTGGACTCTGCTT
GAACCCGGGGATACAATAATATTTGAGGCAAATGGAAATCTAATAGCGCCAA
GATATGCTTTTCGCACTGAGTAGAGGCTTTGGATCAGGAATCATCAACTCAA
TGCACCAATGGATAAATGTGATGCGAAGTGCCAAACACCTCAGGGAGCTATA
AACAGCAGTCTTCTTTCCAGAACGTACACCCAGTCACAATAGGAGAGTGTC
CAAAGTATGTCAGGAGTGCAAAATTAAGGATGGTTACAGGACTAAGGAACAT
CCCATCCATTCAATCCAGAGGTTTGTGTTGGAGCCATTGCCGGTTTCATTGAA
GGGGGGTGGAATGGTAGATGGTTGGTATGGTTATCATCATCAGAAT
GAGCAAGGATCTGGCTATGCTGCAGATCAAAAAAGCACACAAAATGCCATTA
ATGGGATTACAAACAAGGTCAATTCTGTAATTGAGAAAATGAACACTCAATTC
ACAGCAGTGGGCAAAGAGTTCAACAAATTGGAAAGAAGGATGGAAAACCTTG
AATAAAAAAGTTGATGATGGGTTTATAGACATTTGGACATATAATGCAGAACT
GTTGGTTCTACTGGAAAATGAAAGGACTTTGGATTTCCATGACTCCAATGTG
AAGAATCTGTATGAGAAAGTAAAAAGCCAGTTAAAGAATAATGCTAAAGAAAT
AGGAAATGGGTGTTTTGAGTTCTATCACAAGTGTAACGATGAATGCATGGAG
AGTGTAAGAATGGAACCTTATGACTATCCAAAATATTCCGAAGAATCAAAGTT
AAACAGGGAGAAAATTGATGGAGTGAAATTGGAATCAATGGGAGTCTATCAG
ATTCTGGCGATCTACTCAACAGTCGCCAGTTCTCTGGTTCTTTTGGTCTCCC
TGGGGGCAATCAGCTTCTGGATGTGTTCCAATGGGTCTTTACAGTGTAGAAT
ATGCATCTAAGAGCTC

Fig. 29

SEQ ID NO: 37

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACT
AATTAATTAATTAATCATCTTGAGAGAAAATGAAAGTAAACTACTGGTCCTGTTA
TGCACATTTACAGCTACATATGCAGACACAATATGTATAGGCTACCATGCCAACA
ACTCAACCGACACTGTTGACACAGTACTTGAGAAGAATGTGACAGTGACACACT
CTGTCAACCTGCTTGAGGACAGTCACAATGGAAAATTATGTCTATTAAGGAAT
AGCCCCACTACAATTGGGTAATTGCAGCGTTGCCGGATGGATCTTAGGAAACCC
AGAATGCGAATTACTGATTTCCAGGGAATCATGGTCCTACATTGTAGAAAAACCA
AATCCTGAGAATGGAACATGTTACCCAGGGCATTTCGCCGACTATGAGGAAGT
AGGGAGCAATTGAGTTCAGTATCTTCATTTGAGAGATTCGAAATATTCCCCAAAG
AAAGCTCATGGCCCAACCAACCAACCGGAGTATCAGCATCATGCTCCATA
ATGGGGAAAGCAGTTTTTACAAAAATTTGCTATGGCTGACGGGGAAGAATGGTTT
GTACCCAAACCTGAGCAAGTCCTATGCAAACAACAAAGAGAAAGAAGTCCTTGTA
CTATGGGGTGTTTCATCACCCGCCTAACATAGGTGACCAAAGGGCTCTCTATCAT
AAAGAAAATGCTTATGTCTCTGTAGTGTCTTCACATTATAGCAGAAAATTCACCCC
AGAAATAGCCAAAAGACCCAAAGTAAGAGATCAAGAAGGAAGAATCAACTACTAC
TGGACTCTACTTGAACCCGGGGATACAATAATTTGAGGCCAAATGGAAATCTAA
TAGCGCCAAGATATGCTTTCGCACTGAGTAGAGGCTTTGGATCAGGAATCATCA
ACTCAAATGCACCAATGGATGAATGTGATGCGAAGTGCCAAACACCTCAGGGAG
CTATAAACAGCAGTCTTCCTTTCAGAATGTACACCCTGTCACAATAGGAGAGTG
TCCAAAGTATGTCAGGAGTGCAAAATTAAGGATGGTTACAGGACTAAGGAACAT
CCCATCCATTCAATCCAGAGGTTTGTGGAGCCATTGCCGGTTTCATTGAAGG
GGGGTGGACTGGAATGGTAGATGGTTGGTATGGTTATCATCATCAGAATGAGCA
AGGATCTGGCTATGCTGCAGATCAAAAAAGCACACAAAATGCCATTAATGGGATT
ACAAACAAGGTCAATTCTGTAATTGAGAAAATGAACACTCAATTCACAGCTGTGG
GCAAAGAGTTCAACAAATTGGAAGAAGGATGGAAACTTAAATAAAAAAGTTGA
TGATGGGTTTATAGACATTTGGACATATAATGCAGAATTGTTGGTTCTACTGGAA
AATGAAAGGACTTTGGATTTCCATGACTCCAATGTGAAGAATCTGTATGAGAAAG
TAAAAAGCCAATTAAGAATAATGCCAAAGAAATAGGAAATGGGTGTTTTGAGTT
CTATCATAAGTGTAACGATGAATGCATGGAGAGTGTAATAAATGGAAGTTATGAC
TATCCAAAATATTCCGAAGAATCAAAGTTAAACAGGGAGAAAATTGATGGAGTGA
AATTGGAATCAATGGGAGTCTATCAGATTCTGGCGATCTACTCAACAGTCGCCAG
TTCTCTGGTTCTTTTGGTCTCCCTGGGGGCAATCAGCTTCTGGATGTGTTCCAAT
GGGTCTTTGCAGTGTAGAATATGCATCTGAGAGCTC

Fig. 30

SEQ ID NO: 38

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGA
CTAATTAATTAATTAATCATCTTGAGAGAAAATGAAGACTATCATTGCTTTGAG
CTACATTCTATGTCTGGTTTTCACTCAAAAACCTCCCGGAAATGACAACAGCA
CGGCAACGCTGTGCCTTGGGCACCATGCAGTACCAAACGGAACGATAGTGA
AAACAATCACGAATGACCAAATTGAAGTTACTAATGCTACTGAGCTGGTTCAG
AGTTCCTCAACAGGTGAAATATGCGACAGTCCTCATCAGATCCTTGATGGAG
AAAACCTGCACACTAATAGATGCTCTATTGGGAGACCCTCAGTGTGATGGCTT
CCAAAATAAGAAATGGGACCTTTTTGTTGAACGCAGCAAAGCCTACAGCAACT
GTTACCCTTATGATGTGCCGGATTATGCCTCCCTTAGGTCACTAGTTGCCTCA
TCCGGCACACTGGAGTTTAAACAATGAAAGTTTCAATTGGACTGGAGTCACTCA
AAACGGAACAAGCTCTGCTTGCATAAGGAGATCTAATAACAGTTTCTTTAGTA
GATTGAATTGGTTGACCCACTTAAAATTCAAATACCCAGCATTGAACGTGACT
ATGCCAAACAATGAAAAATTTGACAAATTGTACATTTGGGGGGTTCCACCACC
GGGTACGGACAATGACCAAATCTTCCTGTATGCTCAAGCATCAGGAAGAATC
ACAGTCTCTACCAAAGAAGCCAACAACTGTAATCCCGAATATCGGATCTAG
ACCCAGAGTAAGGAATATCCCCAGCAGAATAAGCATCTATTGGACAATAGTAA
AACCGGGAGACATACTTTTGATTAAACAGCACAGGGAATCTAATTGCTCCTAG
GGGTTACTTCAAAATACGAAGTGGGAAAAGCTCAATAATGAGATCAGATGCA
CCCATTGGCAAATGCAATTCTGAATGCATCACTCCAAACGGAAGCATTCCCAA
TGACAAACCATTCCAAAATGTAAACAGGATCACATACGGGGCCTGTCCCAGA
TATGTTAAGCAAAACACTCTGAAATTGGCAACAGGGATGCGAAATGTACCAG
AGAAACAACTAGAGGCATATTTGGCGCAATCGCGGGTTTCATAGAAAATGG
TTGGGAGGGAATGGTGGATGGTTGGTATGGTTTCAGGCATCAAATTCTGAG
GGAATAGGACAAGCAGCAGATCTCAAAGCACTCAAGCAGCAATCGATCAAA
TCAATGGGAAGCTGAATAGGTTGATCGGGAAAACCAACGAGAAATTCATCA
GATTGAAAAAGAGTTCTCAGAAGTCGAAGGGAGAATCCAGGACCTTGAGAAA
TATGTTGAGGACACCAAAATAGATCTCTGGTCAACAACGCGGAGCTTCTTGT
TGCCCTGGAGAACCAACATACAATTGATCTAACTGACTCAGAAATGAACAAAC
TGTTTGAAAAACAAAGAAGCAACTGAGGGAAAATGCTGAGGATATGGGCAA
TGTTTGTTCAAAATATACCACAAATGTGACAATGCCTGCATAGGATCAATCA
GAAATGGAACCTTATGACCACGATGTATACAGAGATGAAGCATTAAACAACCG
GTTCCAGATCAAGGGCGTTGAGCTGAAGTCAGGATACAAAGATTGGATACTA
TGGATTTCTTTGCCATATCATGTTTTTGTCTTGTGTTGCTTGTGTTGGGGTTC
ATCATGTGGGCCTGCCAAAAGGCAACATTAGGTGCAACATTTGCATTTGAG
AGCTC

Fig. 31

SEQ ID NO: 39

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAG
ACTAATTAATTAATTAATCATCTTGAGAGAAAATGAAGACTATCATTGCTTTG
AGCTACATTCTATGTCTGGTTTTCACTCAAAAACCTTCCCGGAAATGACAACA
GCACGGCAACGCTGTGCCTTGGGCACCATGCAGTACCAAACGGAACGATA
GTGAAAACAATCACGAATGACCAAATTGAAGTTACTAATGCTACTGAGCTG
GTTGAGAGTTCCCTCAACAGGTGGAATATGCGACAGTCCTCATCAGATCCTT
GATGGAGAAAACCTGCACACTAATAGATGCTCTATTGGGAGACCCTCAGTGT
GATGGCTTCCAAAATAAGAAATGGGACCTTTTTGTTGAACGCAGCAAAGCC
TACAGCAACTGTTACCCTTATGATGTGCCGGATTATGCCTCCCTTAGGTCA
CTAGTTGCCTCATCCGGCACACTGGAGTTTAACGATGAAAGTTTCAATTGG
ACTGGAGTCACTCAAAATGGAACAAGCTCTGCTTGCAAAGGAGATCTAAT
AACAGTTTCTTTAGTAGATTGAATTGGTTGACCCACTTAAATTCAAATACC
CAGCATTGAACGTGACTATGCCAAACAATGAAAAATTTGACAAATTGTACAT
TTGGGGGGTTTACCACCCGGGTACGGACAATGACCAAATCTTCCTGCATG
CTCAAGCATCAGGAAGAATCACAGTCTCTACCAAAGAAGCCAACAACTG
TAATCCCGAATATCGGATCTAGACCCAGAATAAGGAATATCCCCAGCAGAA
TAAGCATCTATTGGACAATAGTAAAACCGGGAGACATACTTTTGATTAAACAG
CACAGGGAATCTAATTGCTCCTAGGGGTTACTTCAAATACGAAGTGGGAA
AAGCTCAATAATGAGATCAGATGCACCCATTGGCAAATGCAATTCTGAATG
CATCACTCCAAATGGAAGCATTCCCAATGACAAACCATTTCAAATGTAAAC
AGGATCACATATGGGGCCTGTCCCAGATATGTTAAGCAAAACACTCTGAAA
TTGGCAACAGGGATGCGAAATGTACCAGAGAAACAACTAGAGGCATATTT
GGCGCAATCGCGGGTTTCATAGAAAATGGTTGGGAGGGAATGGTGGATGG
TTGGTACGGTTTCAGGCATCAAATCTGAGGGAATAGGACAAGCAGCAGA
TCTCAAAGCACTCAAGCAGCAATCAATCAAATCAATGGGAAGCTGAATAG
GTTGATCGGGAAAACCAACGAGAAATTCCATCAGATTGAAAAAGAGTTCTC
AGAAGTAGAAGGGAGAATCCAGGACCTCGAGAAATATGTTGAGGACACTAA
AATAGATCTCTGGTCATACAACGCGGAGCTTCTTGTTGCCCTGGAGAACCA
ACATACAATTGATCTAACTGACTCAGAAATGAACAACTGTTTGAAAGAACA
AAGAAGCAACTGAGGGAAAATGCTGAGGATATGGGCAATGGTTGTTTCAA
ATATACCACAAATGTGACAATGCCTGCATAGGATCAATCAGAAATGGAACCT
ATGACCATGATGTATACAGAGATGAAGCATTAAACAACCGGTTCCAGATCA
AAGGCGTTGAGCTGAAGTCAGGATACAAAGATTGGATACTATGGATTTCTT
TTGCCATATCATGTTTTTTGCTTTGTGTTGCTTTGTTGGGGTTTCATCATGTG
GGCCTGCCAAAAGGCAACATTAGGTGCAACATTTGCATTTGAGAGCTC

Fig. 32

SEQ ID NO: 40

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGA
GACTAATTAATTAATTAATCATCTTGAGAGAAAATGAAGGCAATAATTGTAC
TACTCATGGTAGTAACATCCAATGCAGATCGAATCTGCACTGGGATAACAT
CGTCAAACCTCACCACATGTTGTCAAACTGCTACTCAAGGGGAGGTCAAT
GTGACTGGTGTAAATACCACTGACAACAACCCACCAAATCTCATTTTGCA
AATCTCAAAGGAACAGAAACCAGAGGGGAACTATGCCCAAATGCCTCAA
CTGCACAGATCTGGACGTGGCCTTGGGCAGACCAAATGCACGGGGAAC
ATACCCTCGGCAAGAGTTTCAATACTCCATGAAGTCAGACCTGTTACATCT
GGGTGCTTTCCTATAATGCACGACAGAACAAAAATTAGACAGCTGCCTAAA
CTTCTCAGAGGATACGAACATATCAGGTTATCAACTCATAACGTTATCAAT
GCAGAAAATGCACCAGGAGGACCCTACAAAATTGGAACCTCAGGGTCTTG
CCCTAACGTTACCAATGGAAACGGATTTTTTCGCAACAATGGCTTGGGCCG
TCCCAAAAAACGACAACAACAAAACAGCAACAATTCATTAACAATAGAAG
TACCATACATTTGTACAGAAGGAGAAGACCAAATTACCGTTTGGGGGTTT
CACTCTGATAACGAAACCCAAATGGCAAAGCTCTATGGGGACTCAAAGCC
CCAGAAGTTCACCTCATCTGCCAACGGAGTGACCACACATTACGTTTCAC
AGATTGGTGGCTTCCCAAATCAAACAGAAGACGGAGGACTACCACAAAGC
GGTAGAATTGTTGTTGATTACATGGTGCAAAAATCTGGGAAAACAGGAAC
AATTACCTATCAAAGAGGTATTTTATTGCCTCAAAAAGTGTGGTGCAGCAAG
TGGCAGGAGCAAGGTAATAAAAGGATCGTTGCCTTTAATTGGAGAAGCAG
ATTGCCTCCACGAAAAATACGGTGGATTAAACAAAAGCAAGCCTTACTACA
CAGGGGAACATGCAAAGGCCATAGGAAATTGCCCAATATGGGTGAAAACA
CCCTTGAAGCTGGCCAATGGAACCAAATATAGACCTCCTGCAAACTATTA
AAGGAAAGGGGTTTCTTCGGAGCTATTGCTGGTTTCTTAGAAGGAGGATG
GGAAGGAATGATTGCAGGTTGGCACGGATACACATCCCATGGGGCACAT
GGAGTAGCGGTGGCAGCAGACCTTAAGAGCACTCAAGAGGCCATAAACA
AGATAACAAAAAATCTCAACTCTTTGAGTGAGCTGGAAGTAAAGAATCTTC
AAAGACTAAGCGGTGCCATGGATGAACTCCACAACGAAATACTAGAACTA
GACGAGAAAGTGGATGATCTCAGAGCTGATACAATAAGCTCACAAATAGA
ACTCGCAGTCCTGCTTTCCTCAATGAAGGAATAATAACAGTGAAGATGAGC
ATCTCTTGGCGCTTGAAAGAAAGCTGAAGAAAATGCTGGGCCCCTCTGCT
GTAGAGATAGGGAATGGATGCTTTGAAACCAAACACAAGTGCAACCAGAC
CTGTCTCGACAGAATAGCTGCTGGTACCTTTGATGCAGGAGAATTTTCTCT
CCCCACTTTTGATTCACTGAATATTACTGCTGCATCTTTAAATGACGATGG
ATTGGATAATCATACTATACTGCTTTACTACTCAACTGCTGCCTCCAGTTT
GGCTGTAAACATTGATGATAGCTATCTTTGTTGTTTATATGGTCTCCAGAGA
CAATGTTTCTTGCTCCATCTGTCTATAAGAGCTC

Fig. 33

SEQ ID NO: 41

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAA
GAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGAAGGCAATAATT
GTACTACTCATGGTAGTAACATCCAATGCAGATCGAATCTGCACTGGAA
TAACATCTTCAAACCTCACCTCATGTGGTCAAAACAGCCACTCAAGGGGA
GGTCAATGTGACTGGTGTGATACCACTAACAACAACCAACAAAATCT
TATTTTGCAAATCTCAAAGGAACAAGGACCAGAGGGAACTATGCCCA
GACTGTCTCAACTGCACAGATCTGGATGTGGCTTTGGGCAGACCAATG
TGTGTGGGGACCACACCTTCGGCGAAGGCTTCAATACTCCACGAAGTC
AAACCTGTTACATCCGGGTGCTTTCCTATAATGCACGACAGAACAAAA
TCAGGCAACTACCCAATCTTCTCAGAGGATATGAAAATATCAGGCTATC
AACCCAAAACGTCATCGATGCGGAAAAGGCACCAGGAGGACCCTACA
GACTTGGAACCTCAGGATCTTGCCCTAACGCTACCAGTAAGAGCGGAT
TTTTCGCAACAATGGCTTGGGCTGTCCCAAAGGACAACAACAAAATG
CAACGAACCCACTAACAGTAGAAGTACCATACATTTGTACAGAAGGGG
AAGACCAAATCACTGTTTGGGGGTTCCATTCAGATAACAAAACCCAAAT
GAAGAACCTCTATGGAGACTCAAATCCTCAAAAGTTCACCTCATCTGCT
AATGGAGTAACCACACACTATGTTTCTCAGATTGGCAGCTTCCCAGATC
AAACAGAAGACGGAGGACTACCACAAAGCGGCAGGATTGTTGTTGATT
ACATGATGCAAAAACCTGGGAAAACAGGAACAATTGTCTACCAAAGAG
GTGTTTTTGTTCCTCAAAGGTGTGGTGCAGGAGTGCCAGGAGCAAA
GTAATAAAAGGGTCCTTGCCTTTAATTGGTGAAGCAGATTGCCTTCATG
AAAAATACGGTGGATTAAACAAAAGCAAGCCTTACTACACAGGAGAACA
TGCAAAAGCCATAGGAAATTGCCCAATATGGGTGAAAACACCTTTGAA
GCTCGCCAATGGAACCAAATATAGACCTCCTGCAAACTATTAAAGGAA
AGGGGTTTTCTTCGGAGCTATTGCTGGTTTTCTAGAAGGAGGATGGGAA
GGAATGATTGCAGGCTGGCACGGATACACATCTCACGGAGCACATGG
AGTGGCAGTGGCGGCGGACCTTAAGAGTACGCAAGAAGCTATAAACAA
GATAACAAAAAATCTCAATTCTTTGAGTGAGCTAGAAGTAAAGAATCTT
CAAAGACTAAGTGGTGCCATGGATGAACTCCACAACGAAATACTCGAG
CTGGATGAGAAAGTGGATGATCTCAGAGCTGACACTATAAGCTCGCAA
ATAGAACTTGCACTCTTGCTTTCCAACGAAGGAATAATAACAGTGAAG
ATGAGCATCTATTGGCACTTGAGAGAAAATAAGAAAATGCTGGGTC
CCTCTGCTGTAGAGATAGGAAATGGATGCTTCGAAACCAAACACAAGT
GCAACCAGACCTGCTTAGACAGGATAGCTGCTGGCACCTTTAATGCAG
GAGAATTTTCTCTCCCCACTTTTGATTCACTGAACATTACTGCTGCATCT
TTAAATGATGATGGATTGGATAACCATATACTGCTCTATTACTCAAC
TGCTGCTTCTAGTTTGGCTGTAACATTGATGCTAGCTATTTTTATTGTTT
ATATGGTCTCCAGAGACAACGTTTCATGCTCCATCTGTCTATAAGAGCT
C

Fig. 34

SEQ ID NO: 42

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAA
GAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGCCATCATTTA
TCTAATTCTCCTGTTACAGCAGTGAGAGGGGACCAAATATGCATTGG
ATACCATGCCAATAATTCCACAGAGAAGGTCGACACAATTCTAGAGCG
GAACGTCACTGTGACTCATGCCAAGGACATTCTTGAGAAGACCCATAA
CGGAAAGTTATGCAAATAACGGAATCCCTCCACTTGAAGTAGGGGA
CTGTAGCATTGCCGGATGGCTCCTTGGAATCCAGAATGTGATAGGCT
TCTAAGTGTGCCAGAATGGTCTATATAATGGAGAAAGAAAACCCGAG
AGACGGTTTGTGTTATCCAGGCAGCTTCAATGATTATGAAGAATTGAAA
CATCTCCTCAGCAGCGTGAAACATTTGAGAAAAGTAAAGATTCTGCCC
AAAGATAGATGGACACAGCATAACAACACTGGAGGTTACGGGCCTG
CGCGGTGTCTGGTAATCCATCATTCTTCAGGAACATGGTCTGGCTGAC
AAAGAAAGAATCAAATTATCCGGTTGCCAAAGGATCGTACAACAATAC
AAGCGGAGAACAAATGCTAATAATTTGGGGGGTGCACCATCCCAATGA
TGAGACAGAACAAGAACATTGTACCAGAATGTGGGAACCTATGTTTC
CGTAGGCACATCAACATTGAACAAAAGGTCAACCCCAGACATAGCAAC
AAGGCCTAAAGTGAATGGACTAGGAAGTAGAATGGAGTTCTCTTGGAC
CCTATTGGATATGTGGGACACCATAAATTTTGAGAGTACTGGTAATCTA
ATTGCACCAGAGTATGGATTCAAATATCGAAAAGAGGTAGTTCAGGG
ATCATGAAAACAGAAGGAACACTTGAGAACTGTGAGACCAAATGCCAA
ACTCCTTTGGGAGCAATAAATAACAACATTGCCTTTTCACAATGTCCACC
CACTGACAATAGGTGAGTGCCCCAAATATGTAAAATCGGAGAAGTTGG
TCTTAGCAACAGGACTAAGGAATGTTCCCCAGATTGAATCAAGAGGAT
TGTTTGGGGCAATAGCTGGTTTTATAGAAGGAGGATGGCAAGGAATG
GTTGATGGTTGGTATGGATACCATCACAGCAATGACCAGGGATCAGG
GTATGCAGCAGACAAAGAATCCACTCAAAAGGCATTTGATGGAATCAC
CAACAAGGTAAATTCTGTGATTGAAAAGATGAACACCCAATTTGAAGCT
GTTGGGAAAGAGTTCAGTAACTTAGAGAGAAGACTGGAGAACTTGAAC
AAAAAGATGGAAGACGGGTTTCTAGATGTGTGGACATACAATGCTGAG
CTTCTAGTTCTGATGGAAAATGAGAGGACACTTGACTTTTCATGATTCTA
ATGTCAAGAATCTGTATGATAAAGTCAGAATGCAGCTGAGAGACAACG
TCAAAGAACTAGGAAATGGATGTTTTGAATTTTATCACAAATGTGATGA
TGAATGCATGAATAGTGTGAAAAACGGGACGTATGATTATCCCAAGTA
TGAAGAAGAGTCTAACTAAATAGAAATGAAATCAAAGGGGTAAAATTG
AGCAGCATGGGGGTTTATCAAATCCTTGCCATTTATGCTACAGTAGCA
GGTTCTCTGTCACTGGCAATCATGATGGCTGGGATCTCTTTCTGGATG
TGCTCCAACGGGTCTCTGCAGTGCAGGATCTGCATATGAGAGCTC

Fig. 35

SEQ ID NO: 43

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAG
AGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGAGAAAATAGTGCT
TCTTCTTGCAATAGTCAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTA
CCATGCAAACAACCTCGACAGAGCAGGTTGACACAATAATGGAAAAGAAC
GTTACTGTTACACATGCCCAAGACATACTGGAAAAGACACACAACGGGA
AGCTCTGCGATCTAGATGGAGTGAAGCCTCTGATTTTAAGAGATTGTAGT
GTAGCTGGATGGCTCCTCGGAAACCCAATGTGTGACGAGTTCATCAATG
TGCCGGAATGGTCTTACATAGTGGAGAAGGCCAACCCAGCCAATGACCT
CTGTTACCCAGGGAATTTCAACGACTATGAAGAACTGAAACACCTATTGA
GCAGAATAAACCATTTTGAGAAAATTGAGATCATCCCCAAAAGTTCTTGG
TCCGATCATGAAGCCTCATCAGGGGTCAGCTCAGCATGTCCATACCAGG
GAACGCCCTCCTTTTTTCAGAAATGTGGTATGGCTTATCAAAAAGAACAAT
ACATACCCAACAATAAAGAGAAGCTACAATAATACCAACCAGGAAGATCT
TTTGATACTGTGGGGGATTCATCATTCTAATGATGCGGCAGAGCAGACAA
AGCTCTATCAAAACCCAACCACTATATTTCCGTTGGGACATCAACACTA
AACCAGAGATTGGTACCAAAAATAGCTACTAGATCCAAAGTAAACGGGCA
AAGTGGAAGGATGGATTTCTTCTGGACAATTTTAAAACCGAATGATGCAA
TCAACTTCGAGAGTAATGGAAATTTCAATTGCTCCAGAATATGCATACAAA
ATTGTCAAGAAAGGGGACTCAGCAATTGTTAAAAGTGAAGTGGAATATGG
TAACTGCAATACAAAGTGTCAAACCTCCAATAGGGGCGATAAACTCTAGTA
TGCCATTCCACAACATACACCCTCTCACCATCGGGGAATGCCCCAAATAT
GTGAAATCAAACAAATTAGTCCTTGCGACTGGGCTCAGAAATAGTCCTCT
AAGAGAAAAGAAGAAGAAAAAGAGGACTATTTGGAGCTATAGCAGGGTTT
ATAGAGGGGAGGATGGCAGGGAATGGTAGATGGTTGGTATGGGTACCAC
CATAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACTC
AAAAGGCAATAGATGGAGTCACCAATAAGGTCAACTCGATCATTGACAAA
ATGAACACTCAGTTTGAGGCCGTTGGAAGGGAATTTAATAACTTAGAAAG
GAGAATAGAGAATTTAAACAAGAAAATGGAAGACGGATTCCTAGATGTCT
GGACTTATAATGCTGAACTTCTGGTTCTCATGGAAAATGAGAGAACTCTA
GACTTCCATGATTCAAATGTCAAGAACCTTTACGACAAGGTCCGACTACA
GCTTAGGGGATAATGCAAAGGAGCTGGGTAACGGTTGTTTCGAGTTCTAT
CACAAATGTGATAATGAATGTATGGAAAGTGTAAGAAACGGAACGTATGA
CTACCCGCAGTATTCAGAAGAAGCAAGATTAAGAGAGAGGAAATAAGT
GGAGTAAATTGGAATCAATAGGAACTTACCAAATACTGTCAATTTATTCA
ACAGTTGCGAGTTCTCTAGCACTGGCAATCATGGTGGCTGGTCTATCTTT
GTGGATGTGCTCCAATGGGTCGTTACAATGCAGAATTTGCATTTAAGAGC
TC

Fig. 36

SEQ ID NO: 44

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGA
GACTAATTAATTAATTAATCATCTTGAGAGAAAATGGAGAAAATAGTGCTTC
TTTTTGCAATAGTCAGTCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCA
TGCAAACAACCTCGACAGAGCAGGTTGACACAATAATGGAAAAGAACGTTA
CTGTTACACATGCCCAAGACATACTGGAAAAGACACACAATGGGAAGCTC
TGCGATCTAGATGGAGTGAAGCCTCTAATTTTGAGAGATTGTAGTGTAGCT
GGATGGCTCCTCGGAAACCCAATGTGTGACGAGTTCATCAATGTGCCGGA
ATGGTCTTACATAGTGGAGAAGGCCAATCCAGTCAATGACCTCTGTTACC
CAGGGGATTTCAATGACTATGAAGAATTGAAACACCTATTGAGCAGAATAA
ACCATTTTGAGAAAATTCAGATCATCCCCAAAAGTTCTTGGTCCAGTCATG
AAGCCTCATTGGGGGTCAGCTCAGCATGTCCATACCAGGGAAAGTCCTCC
TTTTTCAGAAATGTGGTATGGCTTATCAAAAAGAACAGTACATACCCAACA
ATAAGAGGAGCTACAATAATACCAACCAAGAAGATCTTTTGGTACTGTGG
GGGATTCACCATCCTAATGATGCGGCAGAGCAGACAAAGCTCTATCAAAA
CCCAACCACCTATATTTCCGTTGGGACATCTACACTAAACCAGAGATTGGT
ACCAAGAATAGCTACTAGATCCAAAGTAAACGGGCAAAGTGGAAGGATGG
AGTTCTTCTGGACAATTTTAAAACCGAATGATGCAATCAACTTCGAGAGTA
ATGGAAATTTTATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGGGG
ACTCAACAATTATGAAAAGTGAATTGGAATATGGTAACTGCAATACCAAGT
GTCAAACCTCCAATGGGGGCGATAAACTCTAGCATGCCATTCCACAATATAC
ACCCTCTCACCATCGGGGAATGCCCCAAATATGTGAAATCAAACAGATTA
GTCCTTGCGACTGGGCTCAGAAATAGCCCTCAAAGAGAGAGAAGAAGAAA
AAAGAGAGGATTATTTGGAGCTATAGCAGGTTTTATAGAGGGAGGATGGC
AGGGAATGGTAGATGGTTGGTATGGGTACCACCATAGCAACGAGCAGGG
GAGTGGGTACGCTGCAGACAAAGAATCCACTCAAAGGCAATAGATGGAG
TCACCAATAAGGTCAACTCGATTATTGACAAAATGAACACTCAGTTTGAGG
CCGTTGGAAGGGAATTTAACAACCTTAGAAAGGAGAATAGAGAATTTAAACA
AGAAGATGGAAGACGGGTTCCCTAGATGTCTGGACTTATAATGCTGAACTT
CTAGTTCTCATGGAAAACGAGAGAACTCTAGACTTTCATGACTCAAATGTC
AAGAACCTTTACGACAAGGTCCGACTACAGCTTAGGGATAATGCAAAGGA
GCTGGGTAAACGGTTGTTTCGAGTTCTATCATAAATGTGATAATGAATGTAT
GGAAAGTGTAAGAAACGGAACGTATGACTACCCGCAGTATTCAGAAGAAG
CAAGACTAAAAAGAGAGGAAATAAGTGGAGTAAAATTGGAATCAATAGGA
ATTTACCAAATATTGTCAATTTATTCTACAGTGGCCAGCTCCCTAGCACTG
GCAATCATGGTAGCTGGTCTATCCTTATGGATGTGCTCCAATGGGTCTGTT
ACAATGCAGAATTTGCATTTAAGAGCTC

Fig. 37

SEQ ID NO: 45

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGA
GACTAATTAATTAATTAATCATCTTGAGAGAAAATGATTGCAATCATTGTAA
TAGCAATACTGGCAGCAGCCGGAAGTCAGACAAGATCTGCATTGGGTAT
CATGCCAACAATTCAACAACACAGGTAGATACGATACTTGAGAAGAATGT
GACTGTCACACACTCAATTGAATTGCTGGAAAATCAGAAGGAAGAAAGAT
TCTGCAAGATATTGAACAAGGCCCTCTCGACTTAAGGGAATGTACCATA
GAGGGTTGGATCTTGGGGAATCCCCAATGCGACCTATTGCTTGGTGATCA
AAGCTGGTCATACATTGTGGAAGACCTACTGCTCAAAACGGGATCTGCT
ACCCAGGAACCTTAAATGAGGTAGAAGAACTGAGGGCACTTATTGGATCA
GGAGAAAGGGTAGAGAGATTTGAGATGTTTCCCCAAAGCACCTGGCAAG
GAGTTGACACCAACAGTGGAACAACAAGATCCTGCCCTTATTCTACTGGT
GCGTCTTTCTACAGAAACCTCCTATGGATAATAAAAACCAAGACAGCAGA
ATATCCAGTAATTAAGGGAATTTACAACAACACTGGAACCCAGCCAATCCT
CTATTTCTGGGGTGTGCATCATCCTCCTAACACCGACGAGCAAGATACTC
TGTATGGCTCTGGTGATCGATACGTTAGAATGGGAAGTGAAGCATGAAT
TTTGCCAAGAGTCCGGAATTGCGGCAAGGCCTGCTGTGAATGGACAAA
GAGGCAGAATTGATTATTATTGGTCGGTTTTAAACCAGGGGAAACCTTG
AATGTGGAATCTAATGGAATCTAATCGCCCCTTGGTATGCATACAAATTT
GTCAACACAAATAGTAAAGGAGCCGTCTTCAGGTCAGATTTACCAATCGA
GAACTGCGATGCCACATGCCAGACTATTGCAGGGGTTCTAAGGACCAATA
AAACATTTTCAGAATGTGAGTCCCCTGTGGATAGGAGAATGTCCCAAATAC
GTGAAAAGTGAAAGTCTGAGGCTTGCAACTGGACTAAGAAATGTTCCACA
GATTGAACTAGAGGACTCTTCGGAGCTATTGCAGGGTTTATTGAAGGAG
GATGGACTGGGATGATAGATGGGTGGTATGGCTATCACCATGAAAATTCT
CAAGGGTCAGGATATGCAGCAGACAGAGAAAGCACTCAAAGGCTGTAA
ACAGAATTACAAATAAGGTCAATTCCATCATCAACAAAATGAACACACAAT
TTGAAGCTGTTCGATCACGAATTTTCAAATCTGGAGAGGAGAATTGACAAT
CTGAACAAAAGAATGCAAGATGGATTTCTGGATGTTTGGACATACAATGC
TGAAGTGTGGTTCTTCTTGAAAACGAAAGAACACTAGACATGCATGACG
CAAATGTGAAGAACCTACATGAAAAGGTCAAATCACAACTAAGGGACAAT
GCTACGATCTTAGGGAATGGTTGCTTTGAATTTTGGCATAAGTGTGACAAT
GAATGCATAGAGTCTGTCAAAAATGGTACATATGACTATCCCAAATACCAG
ACTGAAAGCAAATTAACAGGCTAAAAATAGAATCAGTAAAGCTAGAGAAC
CTTGGTGTGTATCAAATCTTGCCATTTATAGTACGGTATCGAGCAGCCTA
GTGTTGGTAGGGCTGATCATGGCAATGGGTCTTTGGATGTGTTCAAATGG
TTCAATGCAGTGCAGGATATGTATATAAGAGCTC

Fig. 38

SEQ ID NO: 46

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGA
GACTAATTAATTAATTAATCATCTTGAGAGAAAATGAAACTCAAATTCTAA
TATTAGCCACTTCGGCATTCTTCTATGTACGTGCAGATAAAATCTGCCTAG
GACATCATGCTGTGTCTAATGGAACCAAAGTAGACACCCTTACTGAAAAA
GGAATAGAAGTTGTCAATGCAACAGAAACAGTTGAACAAACAAACATCCC
TAAGATCTGCTCAAAAGGAAAACAGACTGTTGACCTTGGTCAATGTGGAT
TACTAGGGACCGTTATTGGTCCTCCCCAATGTGACCAATTTCTTGAGTTCT
CTGCTAATTTAATAGTTGAAAGAAGGGAAGGTAATGACATTTGTTATCCAG
GCAAATTTGACAATGAAGAAACATTGAGAAAAATACTCAGAAAATCCGGA
GGAATTA AAAAGGAGAATATGGGATTACATATACCGGAGTGAGAACCAA
TGGAGAGACTAGCGCATGTAGAAGGTCAAGATCTTCCTTTTATGCAGAGA
TGAAATGGCTTCTATCCAGCACAGACAATGGGACATTTCCACAAATGACA
AAGTCCTACAAGAACACTAAGAAGGTACCAGCTCTGATAATCTGGGGAAT
CCACCACTCAGGATCAACTACTGAACAGACTAGATTATATGGAAGTGGGA
ATAAATTGATAACAGTTTGGAGTTCCAAATACCAACAATCTTTTGTCCCAA
ATCCTGGACCAAGACCGCAAATGAATGGTCAATCAGGAAGAATTGACTTT
CACTGGCTGATGCTAGATCCCAATGATACTGTCACTTTTCAGTTTTAATGGG
GCCTTTATAGCACCTGACCGCGCCAGTTTTCTAAGAGGTAAATCTCTAGG
AATCCAAAGTGATGCACAACCTTGACAATAATTGTGAAGGTGAATGCTATCA
TATTGGAGGTACTATAATTAGCAACTTGCCCTTTCAAAACATTAATAGTAG
GGCAATCGGAAAATGCCCCAGATACGTGAAGCAGAAGAGCTTAATGCTA
GCAACAGGAATGAAAAATGTTCTGAAGCTCCTGCACATAAACAACAACTAAC
TCATCACATGCGCAAAAAAAGAGGTTTATTTGGTGCAATAGCAGGATTCAT
TGAAAATGGGTGGGAAGGATTAATAGACGGATGGTATGGATATAAGCATC
AGAATGCACAAGGAGAAGGGACTGCTGCAGACTACAAAAGTACACAATCT
GCTATCAACCAAATAACCGGAAAATTGAACAGACTAATAGAAAAAACCAAC
CAGCAATTCGAACTAATAGATAATGAGTTCAATGAAATAGAAAAACAAATT
GGCAATGTTATTA ACTGGACTAGAGATTCTATCATCGAAGTATGGTCATAT
AATGCAGAGTTCCTCGTAGCAGTGGAGAATCAACACACTATTGATTTAACT
GACTCAGAAATGAACAACTATATGAAAAGGTAAGAAGACAACCTGAGAGA
AAATGCTGAGGAAGATGGTAATGGCTGTTTTGAAATATTCCACCAATGTG
ACAATGATTGCATGGCCAGCATTAGAAACAACACATATGACCATAAAAAAT
ACAGAAAAGAGGCAATACAAAACAGAATCCAGATTGACGCAGTAAAGTTG
AGCAGTGGTTACAAAGATATAATACTTTGGTTTAGCTTCGGGGGCATCATG
TTTCTTATTTCTTGCCATTGCAATGGGTCTTGTTTTCATATGTATAAAAAAT
GGAAACATGCGGTGCACTATTTGTATATAAGAGCTC

Fig. 39

SEQ ID NO: 47

CACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGA
GACTAATTAATTAATTAATCATCTTGAGAGAAAATGGAAACAATATCACTAA
TAACTATACTACTAGTAGTAACAGCAAGCAATGCAGATAAAATCTGCATCG
GCCACCAGTCAACAACTCCACAGAACTGTGGACACGCTAACAGAAACC
AATGTTCCCTGTGACACATGCCAAAGAATTGCTCCACACAGAGCATAATGGA
ATGCTGTGTGCAACAAGCCTGGGACATCCCCTCATTCTAGACACATGCAC
TATTGAAGGACTAGTCTATGGCAACCCTTCTTGTGACCTGCTGTTGGGAG
GAAGAGAATGGTCCTACATCGTCGAAAGATCATCAGCTGTAAATGGAACG
TGTTACCCTGGGAATGTAGAAAACCTAGAGGAACTCAGGACACTTTTTAGT
TCCGCTAGTTCCCTACCAAAGAATCCAAATCTTCCCAGACACAACCTGGAAT
GTGACTTAACTGGAACAAGCAGAGCATGTTTCAGGTTTCATTCTACAGGAG
TATGAGATGGCTGACTCAAAGAGCGGTTTTTACCCTGTTCAAGACGCCC
AATACACAAATAACAGGGGAAAGAGCATTCTTTTCGTGTGGGGCATAAT
CACCCACCCACCTATACCGAGCAAACAAATTTGTACATAAGAAACGACACA
ACAACAAGCGTGACAACAGAAGATTTGAATAGGACCTTCAAACCAGTGATA
GGGCAAGGCCCTTGTCAATGGTCTGCAGGGAAGAATTGATTATTATTG
GTCGGTACTAAAACCAGGCCAAACATTGCGAGTACGATCCAATGGGAATC
TAATTGCTCCATGGTATGGACACGTTCTTTCAGGAGGGAGCCATGGAAGA
ATCCTGAAGACTGATTTAAAAGGTGGTAATTGTGTAGTGCAATGTCAGACT
GAAAAAGGTGGCTTAAACAGTACATTGCCATTCCACAATATCAGTAAATAT
GCATTTGGAACCTGCCCCAAATATGTAAGAGTTAATAGTCTCAAACCTGGCA
GTCGGTCTGAGGAACGTGCCTGCTAGATCAAGTAGAGGACTATTTGGAGC
CATAGCTGGATTCATAGAAGGAGGTTGGCCAGGACTAGTCGCTGGCTGG
TATGGTTTCCAGCATTCAAATGATCAAGGGGTTGGTATGGCTGCAGATAG
GGATTCAACTCAAAGGCAATTGATAAAATAACATCCAAGGTGAATAATAT
AGTCGACAAGATGAACAAGCAATATGAAATAATTGATCATGAATTTAGTGA
GGTTGAACTAGACTCAATATGATCAATAATAAGATTGATGACCAAATACA
AGACGTATGGGCATATAATGCAGAATTGCTAGTACTACTTGAAAATCAAAA
AACACTCGATGAGCATGATGCGAACGTGAACAATCTATATAACAAGGTGA
AGAGGGCACTGGGCTCCAATGCTATGGAAGATGGGAAAGGCTGTTTCGA
GCTATAACCATAAATGTGATGATCAGTGCATGGAAACAATTCGGAACGGGA
CCTATAATAGGAGAAAGTATAGAGAGGAATCAAGACTAGAAAGGCAGAAA
ATAGAGGGGGTTAAGCTGGAATCTGAGGGAACCTACAAAATCCTCACCAT
TTATTCGACTGTCGCCTCATCTCTTGTGCTTGCAATGGGGTTTGCTGCCTT
CCTGTTCTGGGCCATGTCCAATGGATCTTGCAGATGCAACATTTGTATATA
AGAGCTC

Fig. 40A

SEQ ID NO: 48

MKVKLLVLLCTFTATYADTICIGYHANNSTDTVDTVLEKNVTVTHSVNLLEN SH
NGKLCLLKGIAPLQLGNCSVAGWILGNPECELLISKESWSYIVEKPNPENGTCY
PGHFADYEELREQLSSVSSFERFEIFPKESSWPNHVTGVSASCSHNGESSF
YRNLLWLTGKNGLYPNLSKSYANNKEKEVLVLWGVHPPNIGDQKALYHTEN
AYVSVVSSHYSRKFTPEIAKRPKVRDQEGRINYYWTLLEPGDTIIFEANGNLIAP
RYAFALSRGFGSGIINSNAPMDKCDAKCQTPQGAINSSLPFQNVHPVTIGEC P
KYVRS AKLRMVTGLRNIPSIQSRGLFGAIAGFIEGGWTGMVDGWYGYHHQNE
QGSGYAADQKSTQNAINGITNKVNSVIEKMNTQFTAVGKEFNKLERRMENLNK
KVDDGFIDIW TYNAELLV LLENERTLDFHDSNVKNLYEKVKSQ LKNNAKEIGNG
CFEFYHKCNDECMESVKNGTYDYPKYSEESKLNREKIDGVKLESMGVYQILAI
YSTVASSLVLLVSLGAISFWMCSNGSLQCRICI

Fig. 40B

SEQ ID NO: 49

MKVKLLVLLCTFTATYADTICIGYHANNSTDTVDTVLEKNVTVTHSVNLLED SH
NGKLCLLKGIAPLQLGNCSVAGWILGNPECELLISRESWSYIVEKPNPENGTCY
PGHFADYEELREQLSSVSSFERFEIFPKESSWPNH TTTGVSASCSHNGESSFY
KNLLWLTGKNGLYPNLSKSYANNKEKEVLVLWGVHPPNIGDQ RALYHKENA
YVSVVSSHYSRKFTPEIAKRPKVRDQEGRINYYWTLLEPGDTIIFEANGNLIAPR
YAFALSRGFGSGIINSNAPMDECDACQTPQGAINSSLPFQNVHPVTIGEC PK
YVRS AKLRMVTGLRNIPSIQSRGLFGAIAGFIEGGWTGMVDGWYGYHHQNEQ
GSGYAADQKSTQNAINGITNKVNSVIEKMNTQFTAVGKEFNKLERRMENLNKK
VDDGFIDIW TYNAELLV LLENERTLDFHDSNVKNLYEKVKSQ LKNNAKEIGNG
FEFYHKCNDECMESVKNGTYDYPKYSEESKLNREKIDGVKLESMGVYQILAIY
STVASSLVLLVSLGAISFWMCSNGSLQCRICI

Fig. 41A

SEQ ID NO: 50

MKTIIALSYILCLVFTQKLPGNDNSTATLCLGHHAVPNGTIVKTITNDQIEVTN
ATELVQSSSTGEICDSPHQILDGENCTLIDALLGDPQCDGFQNKKWDLFVE
RSKAYSNCYPYDVPDYASLRSLVASSGTLEFNNEFSNWTGVTQNGTSSA
CIRRSNNSFFSRLNWLTHLKFKYPALNVTMPNNEKFDKLYIWGVHHPGTD
NDQIFLYAQASGRITVSTKRSQQTVIPNIGSRPRVRNIPSRISYWTIVKPGDI
LLINSTGNLIAPRGYFKIRSGKSSIMRSDAPIGKCNSCITPNGSIPNDKPFQ
NVNRITYGACPRYVKQNTLKLATGMRNVPEKQTRGIFGAIAGFIENGWEG
MVDGWYGFRRHQNSEGIGQAADLKSTQAAIDQINGKLNRLIGKTNEKFHQIE
KEFSEVEGRIQDLEKYVEDTKIDLWSYNAELLVALENQHTIDLTDSMNKLF
EKTKKQLRENAEDMGNGCFKIYHKCDNACIGSIRNGTYDHDVYRDEALNN
RFQIKGVELKSGYKDWILWISFAISCFLLCVALLGFIMWACQKGNIRCNICI

Fig. 41B

SEQ ID NO: 51

MKTIIALSYILCLVFTQKLPGNDNSTATLCLGHHAVPNGTIVKTITNDQIEVTN
ATELVQSSSTGGICDSPHQILDGENCTLIDALLGDPQCDGFQNKKWDLFVE
RSKAYSNCYPYDVPDYASLRSLVASSGTLEFNDESFNWTGVTQNGTSSA
CKRRSNNSFFSRLNWLTHLKFKYPALNVTMPNNEKFDKLYIWGVHHPGTD
NDQIFLHAQASGRITVSTKRSQQTVIPNIGSRPRIRNIPSRISYWTIVKPGDI
LLINSTGNLIAPRGYFKIRSGKSSIMRSDAPIGKCNSCITPNGSIPNDKPFQ
NVNRITYGACPRYVKQNTLKLATGMRNVPEKQTRGIFGAIAGFIENGWEG
MVDGWYGFRRHQNSEGIGQAADLKSTQAAINQINGKLNRLIGKTNEKFHQIE
KEFSEVEGRIQDLEKYVEDTKIDLWSYNAELLVALENQHTIDLTDSMNKLF
ERTKKQLRENAEDMGNGCFKIYHKCDNACIGSIRNGTYDHDVYRDEALNN
RFQIKGVELKSGYKDWILWISFAISCFLLCVALLGFIMWACQKGNIRCNICI

Fig. 42A

SEQ ID NO: 52

MKAIIVLLMVVTSNADRICTGITSSNSPHVVKATQGEVNVTVGVIPLTTTPTKS
HFANLKGTE TRGKLC PKCLNCTDLDVALGRPKCTGNIPSARVSILHEVRPVT
SGCFPIIMHDRTKIRQLPKLLRGYEHIRLSTHNVINAENAPGGPYKIGTSGSCP
NVTNGNGFFATMAWAVPKDNNKTATNSLTIEVPYICTEGEDQITVWGFHS
DNETQMAKLYGDSKPQKFTSSANGVTTHYVSQIGGFPNQTEDGGLPQSGRI
VVDYMVQKSGKTGTITYQRGILLPQKWWCASGRSKVIKGSPLIGEADCLHE
KYGGLNKS KPYTGEHAKAIGNCPIWVKTP LKLANGTKYRPPAKLLKERGFF
GAIAGFLEGGWEGMIAGWHGYTSHGAHGVAVAADLKSTQEAINKITKNLNS
LSELEVKNLQRLSGAMDELHNEILELDEKVDDL RADTISSQIELAVLLSNEGIIIN
SEDEHLLALERK LK KMLGPSAVEIGNGCFETKHKCNQTCLDRIAAGTFDAGE
FSLPTFD SLNITAASLNDDGLDNHTILLYSTAASSLAVTLMIAIFVVMVSRD
NVSCSICL

Fig. 42B

SEQ ID NO: 53

MKAIIVLLMVVTSNADRICTGITSSNSPHVVKATQGEVNVTVGVIPLTTTPTKS
YFANLKGTRTRGKLCPDCLNCTDLDVALGRPMC VGTTPSAKASILHEVKPVT
SGCFPIIMHDRTKIRQLPNLLRGYENIRLSTQNVIDAEKAPGGPYRLGTSGSC
PNATSKSGFFATMAWAVPKDNNKNATNPLTVEVPYICTEGEDQITVWGFHS
DNKTQMKNLYGDSNPQKFTSSANGVTTHYVSQIGSFPDQTEDGGLPQSGRI
VVDYMMQKPGKTGTIVYQRGVLLPQKWWCASGRSKVIKGSPLIGEADCLH
EKYGGLNKS KPYTGEHAKAIGNCPIWVKTP LKLANGTKYRPPAKLLKERGF
FGAIAGFLEGGWEGMIAGWHGYTSHGAHGVAVAADLKSTQEAINKITKNLN
SLSELEVKNLQRLSGAMDELHNEILELDEKVDDL RADTISSQIELAVLLSNEGII
NSEDEHLLALERK LK KMLGPSAVEIGNGCFETKHKCNQTCLDRIAAGTFNAG
EFSLPTFD SLNITAASLNDDGLDNHTILLYSTAASSLAVTLMIAIFIVVMVSRD
NVSCSICL

Fig. 43A

SEQ ID NO: 54

MAIYLILLFTAVRGDQICIGYHANNSTEKVDTILERNVTVTHAKDILEKTHNGKLC
KLNGIPPLELGDCSIAGWLLGNPECDRLLSVPEWSYIMEKENPRDGLCYPGSF
NDYEELKHLLSSVKHFEEKVILPKDRWTQHHTTTGGSRAVSGNPSFFRNMV
WLTKKESNYPVAKGSYNNTSGEQMLIIVGVHHPNDETEQRTLYQNVGTYSV
GTSTLNKRSTPDIAIRPKVNLGSRMEFSWTLDMWDTINFESTGNLIAPEYGF
KISKRGSSGIMKTEGTLENCETKCQTPLGAINTTLPFHNHPLTIGECPKYVKSE
KLVLATGLRNV PQIESRGLFGAIAGFIEGGWQGMVDGWYGYHHSNDQGSGYA
ADKESTQKAFDGITNKVNSVIEKMNTQFEAVGKEFSNLERRLENLNKKMEDGFL
DVWTYNAELLVLMENERTLDFHDSNVKNLYDKVRMQLRDNVKELGNGCFEY
HKCDDECMNSVKNGTYDYPKYEEESKLNREIKGVKLSSMGVYQILAIYATVAG
SLSLAIMMAGISFWMCNGLSLQCRIC

Fig. 43B

SEQ ID NO: 55

MEKIVLLLAIVSLVKSDQICIGYHANNSTEQVDTIMEKNVTVTHAQDILEKTHNGK
LCDLDGVKPLILRDCSVAGWLLGNPMCDEFINPEWSYIVEKANPANDLCYPG
NFNDYEELKHLLSRINHFEEKIIPKSSWSDEASSGVSSACPYQGTPSFFRNVV
WLIKKNNPTYPTIKRSYNNTNQEDLLILWGIHHSNDAAEQTKLYQNPTTYISVGTS
TLNQRLVPKIATRISKVNGQSGRMDFFWTILKPNDAINFESNGNFIAPEYAYKIVK
KGDSAIVKSEVEYGNCKTKCQTPIGAINSSMPFHNIHPLTIGECPKYVKSNNKLVL
ATGLRNSPLRERRRRKRGLFGAIAGFIEGGWQGMVDGWYGYHHSNEQGSGYA
ADKESTQKAIDGVTKVNSIIDKMNTQFEAVGREFNNLERRIENLNKKMEDGFL
DVWTYNAELLVLMENERTLDFHDSNVKNLYDKVRLQLRDNKELGNGCFEYH
KCDNECMESVRNGTYDYPQYSEEARLKREEISGVKLESIGTYQILSIYSTVASSL
ALAIMVAGLSLWMCSNGLSLQCRIC

Fig. 44A

SEQ ID NO: 56

MEKIVLLFAIVSLVKSDQICIGYHANNSTEQVDTIMEKNVTVTTHAQDILEKTHNGKL
CDLDGVKPLILRDCSVAGWLLGNPMCDEFINVPEWSYIVEKANPVNDLCYPGDF
NDYEELKHLLSRINHFEKIQIIPKSSWSSHEASLGVSACPYQGKSSFFRNVVWLI
KKNSTYPTIKRSYNNTNQEDLLVLWGIHHPNDAAEQTKLYQNPTTYISVGTSTLN
QRLVPRIATRSKVNGQSGRMEFFWTILKPNDAINFESNGNFIAPEYAYKIVKKGD
STIMKSELEYGNCNTKCQTPMGAINSSMPFHNIHPLTIGECPKYVKS NRLVLATG
LRNSPQRRERRRKRGLFGAIAFGIEGGWQGMVDGWYGYHHSNEQGSGYAAD
KESTQKAIDGVTNKVNSIIDKMNTQFEAVGREFNNLERRIENLNKKMEDGFLDV
WTYNAELLVLMENERTLDFHDSNVKNLYDKVRLQLRDN AKELGNGCFEFYHKC
DNECMESVRNGTYDYPQYSEEARLKREEISGVKLESIGIYQILSIYSTVASSLALAI
MVAGLSLWMCSNGSLQCRICI

Fig. 44B

SEQ ID NO: 57

MIAIIVAILAAAGKSDKICIGYHANNSTTQVDTILEKNVTVTTHSIELLENQKEERFCK
ILNKAPLDLRECTIEGWILGNPQCDLLLDGQSWSYIVERPTAQNGICYPGTLNEV
EELRALIGSGERVERFERFEMFPQSTWQGVDTNSGTTRSCPYSTGASFYRNLLWIIK
TKTAEYPVIKGIYNNTGTQPILYFWGVHHPNTDEQDTLYGSGDRYVRMGTESM
NFAKSPEIAARPAVNGQRGRIDYYWSVLKPGETLNVESNGNLIAPWYAYKFVNT
NSKGAVFRSDLPIENC DATCQTIAGVLR TNKTFQNV SPLWIGECPKYVKSESLRL
ATGLRNPQIETRGLFGAIAFGIEGGWTGMIDGWYGYHHENSQGSGYAADRES
TQKAVNRITNKVNSIINKMNTQFEAVDHEFSNLERRIDNLNKRMQDGFLDVWY
NAELLV LLENERTLDMHDANVKNLHEKVKSQLRDNATILGNGCFEFWHKCDNEC
IESVKNGTYDYPKYQTESKLNRLKIESVKLENLGVYQILAIYSTVSSSLVLVGLIMA
MGLWMCSNGSMQCRICI

Fig. 45A

SEQ ID NO: 58

MNTQILILATSAFFYVRADKICLGHHAVSNGTKVDTLTEKGIEVVNATETVEQT
NIPKICSKGKQTVDLGQCGLLGTVIGPPQCDQFLEFSANLIVERREGNDICYPG
KFDNEETLRKILRKSGGIKKENMGFTYTGVRTNGETSACRRSRSSFYAEMKW
LLSSTDNGTFPQMTKSYKNTKKVPALIIWGIHHSGSTTEQTRLYGSGNKLITV
WSSKYQQSFVPNPGRPQMNGQSGRIDFHWLMLDPNDTVTFSFNAGAFIAPD
RASFLRGKSLGIQSDAQLDNNCEGECYHIGGTIISNLPFQNINSRAIGKCPRYV
KQKSLMLATGMKNVPEAPAHKQLTHHMRKKRGLFGAIAGFIENGWEGLIDG
WYGYKHQNAQGEGTAADYKSTQSAINQITGKLNRLIEKTNQQFELIDNEFNEI
EKQIGNVINWTRDSIIEVWSYNAEFLVAVENQHTIDLTDSMNKLYEKVRRQL
RENAEEDGNGCFEIFHQCDNDCMASIRNNTYDHKKYRKEAIQNRIQIDAVKLS
SGYKDILWFSGASCFLFLAIAMGLVFICIKNGNMRTIC

Fig. 45B

SEQ ID NO: 59

METISLITILLVVTASNADKICIGHQSTNSTETVDTLTETNVPVTHAKELLHTEHN
GMLCATSLGHPLILDTCTIEGLVYGNPSCDLLLGGREWSYIVERSSAVNGTCY
PGNVENLEELRTLFSASSYQRIQIFPDTTWNVTYTGTSRACSGSFYRSMRW
LTQKSGFYPVQDAQYTNNRGKSILFVWGIHHPPTYTEQTNLYIRNDTTTSVTT
EDLNRTFKPVIGPRPLVNGLQGRIDYYWSVLKPGQTLRVRSNGNLIAPWYGH
VLSGGSHGRILKTDLKGGNCVVQCQTEKGGLNSTLPFHNISKYAFGTCPKYV
RVNSLKLAVGLRNVPARSSRGLFGAIAGFIEGGWPGLVAGWYGFQHSNDQG
VGMAARDSTQKAIDKITSKVNNIVDKMNKQYEIIDHEFSEVETRLNMINNKID
DQIQDVWAYNAELLVLENQKTLDEHDANVNNLYNKVKRALGSNAMEDGKG
CFELYHKDDQCMETIRNGTYNRRKYREESRLERQKIEGVKLESEGTYKILTI
YSTVASSLVLAMGFAAFLFWAMSNNGSCRCNIC

Fig.46

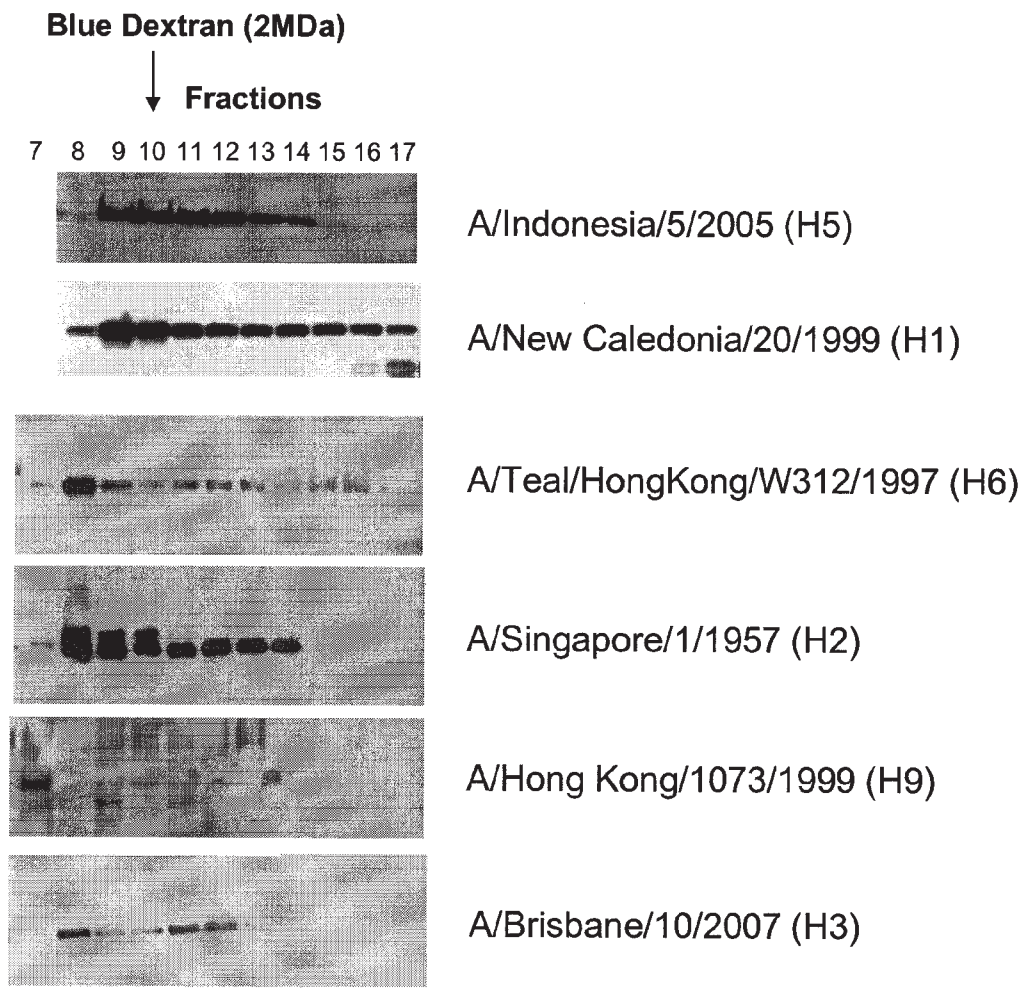


Fig. 47

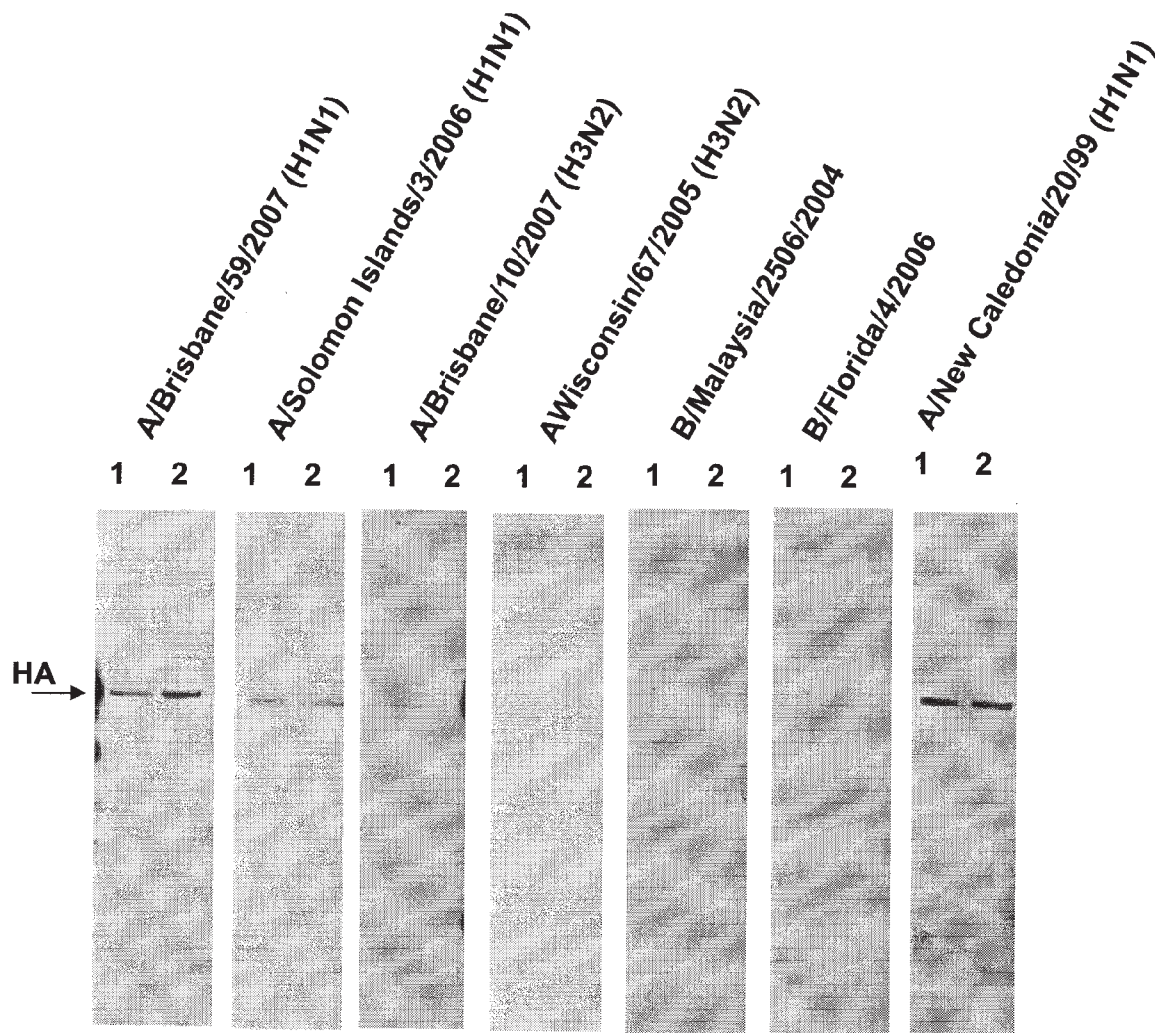


Fig. 48a

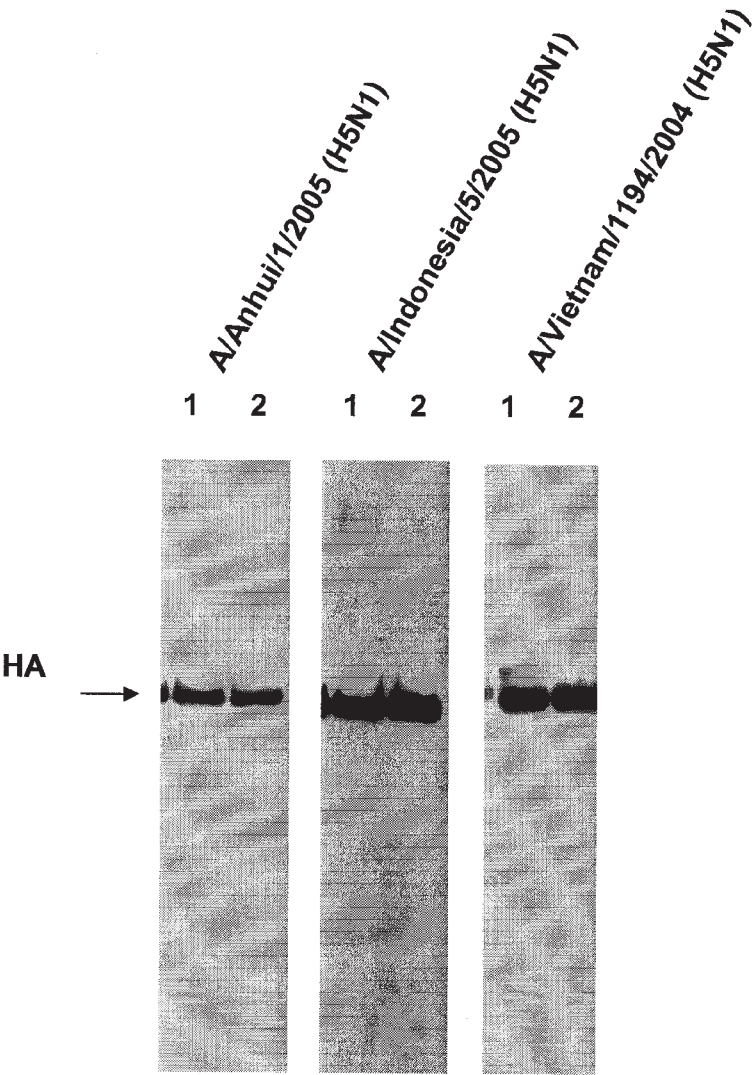


Fig. 48b

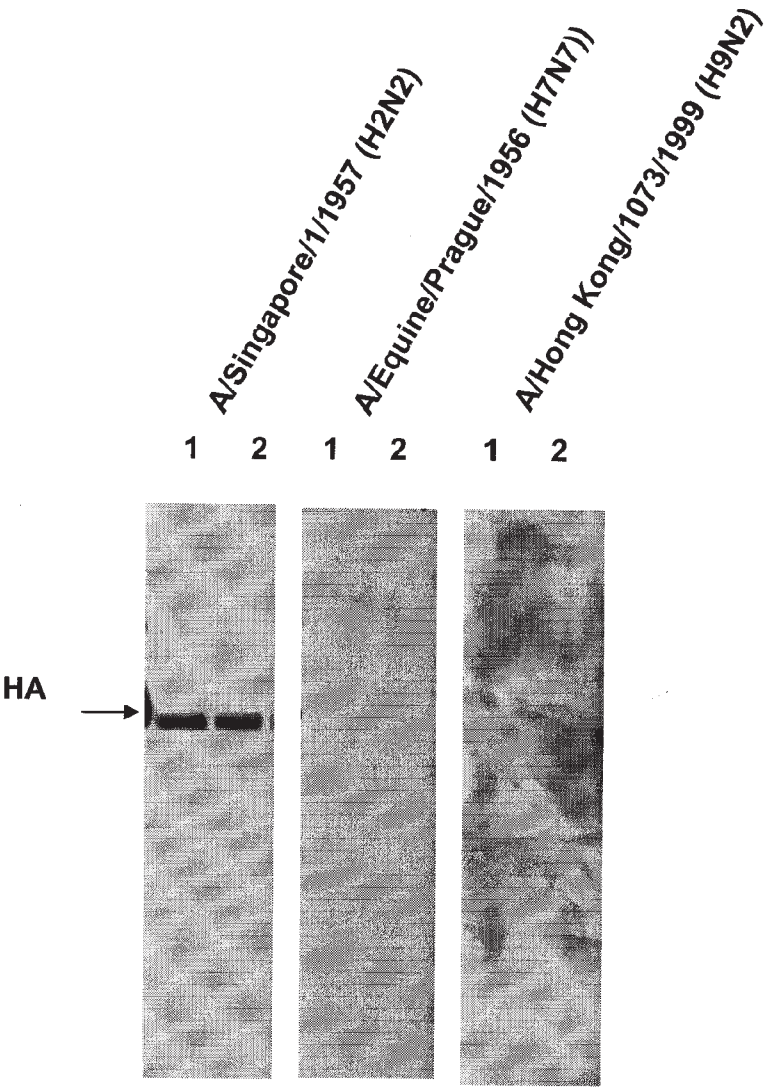


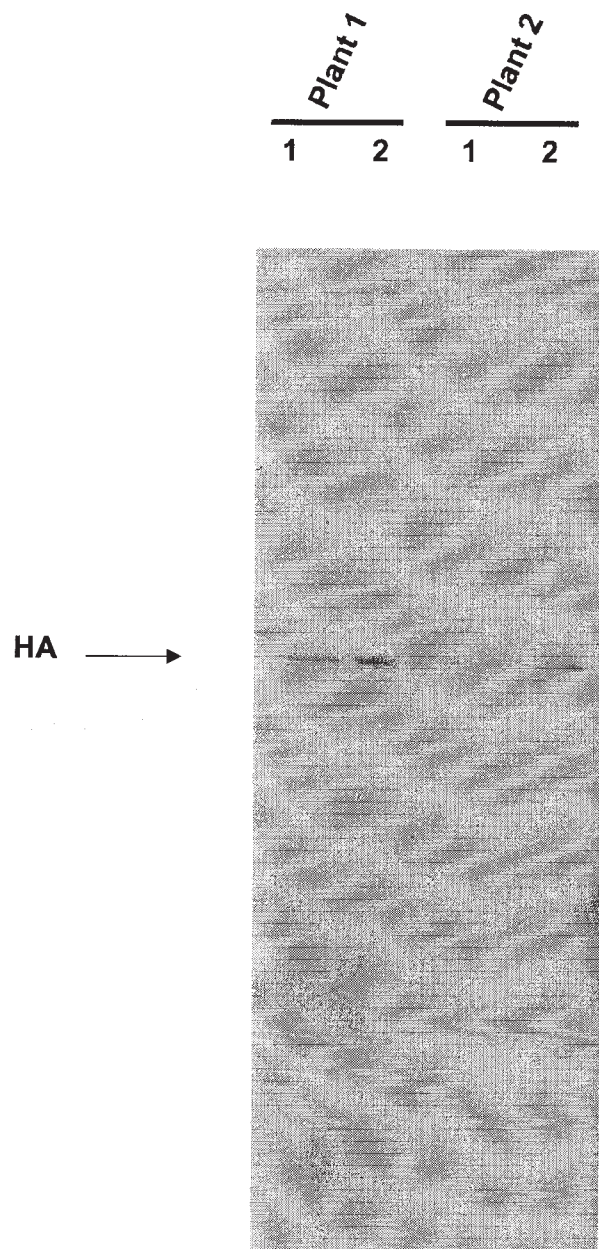
Fig. 49

Fig. 50A

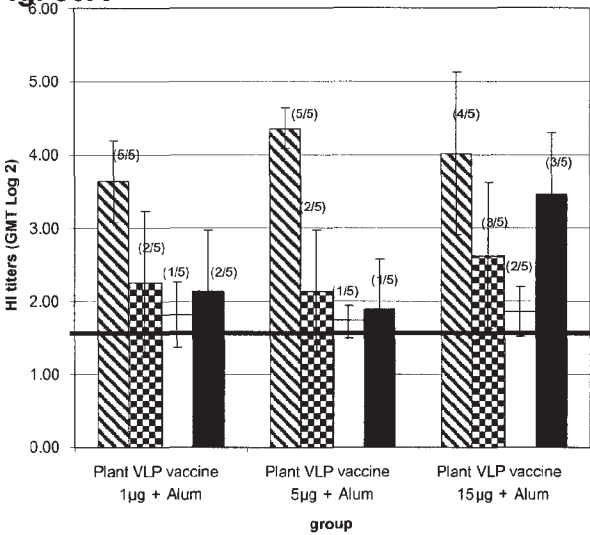


Fig. 50B

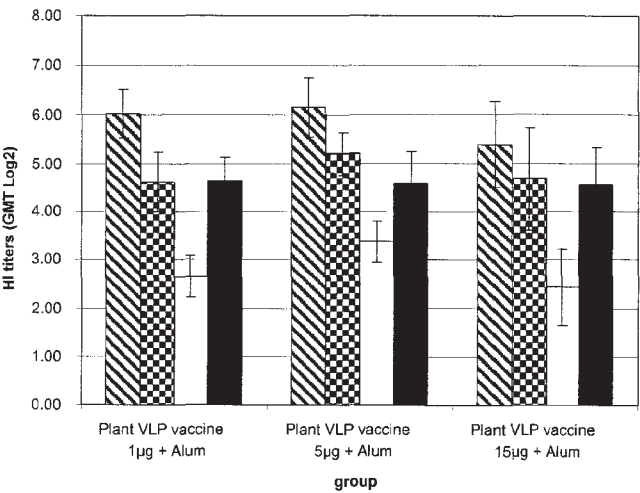


Fig. 51

SEQ ID NO: 60

H5 from A/Indonesia/5/2005 (Construct # 660)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAAAGTT
AGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAAC
ATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTTGCA
ACATTTGAGAAAATTTTGTTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAA
GAGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTGTACCAAATAG
TTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAA
TAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTGGCAAGTCATTAAGAAAGAAAGAAT
AAATTATTTTTAAATTAAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAATTGATGAAA
GAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTT
CCTATATATTGCCCATAGAGTCAGTTAACTCATTTTTATTTTCATAGATCAAATAAGAGAAATAA
CGGTATATTAATCCCTCCAAAAAAGGATATTTACTAAAAATCTAAGCCACGTAGGAG
GATAACAGGATCCCGTAGGAGGATAACATCCAATCCAACCAATCACAACAATCCTGATGAGATA
ACCCACTTTAAGCCACGCATCTGTGGCACATCTACATTATCTAAATCACACATTCTCCACACAT
CTGAGCCACACAAAAACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGT
CTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGA
GAGAAAATGGAGAAAATAGTGCTTCTTCTTGAATAGTCAGTCTTGTTAAAGTGATCAGATTGCG
ATTGGTTACCATGCAACAATTCACAGAGCAGGTTGACACAATCATGGAAAAGAACGTTACTGT
TACACATGCCCAAGACATACTGGAAAAGACACACAACGGGAAGCTCTGCGATCTAGATGGAGTG
AAGCCTCTAATTTTAAGAGATTGTAGTGTAGCTGGATGGCTCCTCGGGAACCCAATGTGTGACGA
ATTCATCAATGTACCGGAATGGTCTTACATAGTGGAGAAGGCCAATCCAACCAATGACCTCTGTT
ACCCAGGGAGTTTCAACGACTATGAAGAAGTGAACACCTATTGAGCAGAATAAACCATTTTGAG
AAAATTCAAATCATCCCCAAAAGTTCTTGGTCCGATCATGAAGCCTCATCAGGAGTTAGCTCAGC
ATGTCCATACCTGGGAAGTCCCTCTTTTTAGAAATGTGGTATGGCTTATCAAAAAGAACAGTA
CATACCCAACAATAAAGAAAAGCTACAATAATACCAACCAAGAGGATCTTTTGGTACTGTGGGGA
ATTCACCATCCTAATGATGCGGCAGAGCAGACAAGGCTATATCAAAACCCAACCACCTATATTTT
CATTGGGACATCAACACTAAACCAGAGATTGGTACCAAAAATAGCTACTAGATCCAAAGTAAACG
GGCAAAGTGGAAGGATGGAGTTCTTCTGGACAATTTTAAACCTAATGATGCAATCAACTTCGAG
AGTAATGGAAATTTTATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGGGGACTCAGCAATT
ATGAAAAGTGAATTGGAATATGGTAAGTCAACACCAAGTGTCAAATCCAATGGGGGCGATAAA
CTCTAGTATGCCATTCCACAACATACACCTCTCACCATCGGGGAATGCCCAATATGTGAAAT
CAAACAGATTAGTCCTTGAACAGGGCTCAGAAATAGCCCTCAAAGAGAGAGCAGAAGAAAAA
GAGAGGACTATTTGGAGCTATAGCAGGTTTTATAGAGGGAGGATGGCAGGGAATGGTAGATGGT
TGGTATGGGTACCACCATAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACTC
AAAAGGCAATAGATGGAGTCACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAGTTT
GAGGCCGTTGGAAGGGAATTTAATAACTTAGAAAGGAGAATAGAGAATTTAAACAAGAAGATGGA
AGACGGGTTTCTAGATGTCTGGACTTATAATGCCGAACCTTCTGGTTCTCATGGAAAATGAGAGAA
CTCTAGACTTTTCTAGACTCAAATGTTAAGAACCTCTACGACAAGGTCCGACTACAGCTTAGGGAT
AATGCAAAGGAGCTGGGTAACGGTTGTTTCGAGTTCTATCACAAATGTGATAATGAATGTATGGA
AAGTATAAGAAACGGAACGTACAACCTATCCGCGAGTATTCAGAAGAAGCAAGATTAAGAAAGAGAGG
AAATAAGTGGGGTAAATTTGGAATCAATAGGAACCTACCAATACTGTCAATTTATTCAACAGTGG
CGAGTTCCCTAGCACTGGCAATCATGATGGCTGGTCTATCTTTATGGATGTGCTCCAATGGATCG
TTACAATGCAGAATTTGCATTTAAGAGCTCTAAGTTAAATGCTTCTTCGCTCCTATTTATAATAT
GGTTTGTATTGTTAATTTTGTCTTGTAGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTAT
TTGTATGAGATGAAGTGGTGAATGTAATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCC
TCCATAACTAACTAGACATGAAGACCTGCCGCGTACAATTGTCTTATATTTGAACAATAAATTG
AACATCTTTTGCCACAACCTTTATAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATT
AATAATGGAAATATCAGTTATCGAAATTCATTAACAATCAACTTAACGTTATTAATACTAATTTTAT
ATCATCCCCTTTGATAAATGATAGTACA

Fig. 52

SEQ ID NO: 61

H1 from A/New Caledonia/20/1999 (Construct # 540)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAAGTT
AGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAAC
ATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTTGCA
ACATTTGAGAAAATTTTGTTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAA
GAGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTGTACCAAAATAG
TTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAA
TAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAAAAGAAAGAA
TAAATTATTTTTAAATTAAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAATTGATGAA
AGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTT
TCCTATATATTGCCCATAGAGTCAGTTAACTCATTTTTATATTTATAGATCAAAATAAGAGAAATA
ACGGTATATTAATCCCTCCAAAAAAGAAACGGTATATTTACTAAAAATCTAAGCCACGTAGGA
GGATAACAGGATCCCGTAGGAGGATAACATCCAATCCAACCAATCACAACAATCCTGATGAGA
TAACCCACTTTAAGCCACGCATCTGTGGCACATCTACATTATCTAAATCACACATTCTCCACAC
ATCTGAGCCACACAAAAACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGA
GTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTT
GAGAGAAAATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTCTTCTGTGTTGGTTCTT
CTCAGATCTTCGCTGACACAATATGTATAGGCTACCATGCCAACAACTCAACCGACACTGTTGAC
ACAGTACTTGAGAAGAATGTGACAGTGACACACTCTGTCAACCTACTTGAGGACAGTCACAATG
GAAAATATGTCTACTAAAAGGAATAGCCCCACTACAATTGGGTAATTGCAGCGTTGCCGGATG
GATCTTAGGAAACCCAGAATGCGAATTACTGATTTCCAAGGAATCATGGTCCTACATTGTAGAAA
CACCAATCCTGAGAATGGAACATGTTACCCAGGGTATTTCCGCCGACTATGAGGAACTGAGGGA
GCAATTGAGTTCAGTATCTTCATTGAGAGATTCGAAATATTTCCCAAAGAAAGCTCATGGCCCA
ACCACACCGTAACCGGAGTATCAGCATCATGCTCCCATAAATGGGAAAAGCAGTTTTTACAGAAAT
TTGCTATGGCTGACGGGGAAGAATGGTTTGTAACCAACCTGAGCAAGTCCTATGTAAACAACA
AAGAGAAAGAAGTCCTTGACTATGGGGTGTTCATCACCCGCCTAACATAGGGAACCAAGGGC
ACTCTATCATACAGAAAATGCTTATGTCTCTGTAGTGTCTTCACATTATAGCAGAAGATTCACCCC
AGAAATAGCCAAAAGACCCAAAGTAAGAGATCAGGAAGGAAGAATCACTACTACTGGACTCTG
CTGGAACCTGGGGATACAATAATATTTGAGGCCAATGGAAATCTAATAGCGCCATGGTATGCTTT
TGCAGTGAGTAGAGGCTTTGGATCAGGAATCATCACCTCAAATGCACCAATGGATGAATGTGAT
GCGAAGTGTCAAACACCTCAGGGAGCTATCAACAGCAGTCTTCCTTTCCAGATATGACACCCAG
TCACAATAGGAGAGTGTCCAAAGTATGTACAGGAGTGCAAAATTAAGGATGGTTACAGCACTAAG
GAACATCCCATCCATTCAATCCAGAGGTTTTGTTGGAGCCATTGCCGGTTTCATTGAAGGGGGG
TGGACTGGAATGGTAGATGGGTGGTATGGTTATCATCATCAGAATGAGCAAGGATCTGGCTATG
CTGCAGATCAAAAAAGTACACAAAATGCCATTAACGGGATTACAAACAAGGTCAATTCTGTAATT
GAGAAAATGAACACTCAATTCACAGCTGTGGGCAAAGAGTTCAACAAATTGGAAAGAAGGATGG
AAAATTTAAATAAAAAAGTTGATGATGGGTTCTAGACATTTGGACATATAATGCAGAATTGTTGG
TTCTACTGGAAAATGAAAGGACTTTGGATTTCCATGACTCCAATGTGAAGAATCTGTATGAGAAA
GTAAAAAGCCAATTAAGAATAATGCCAAAGAAATAGGAAACGGGTGTTTTGAGTTCTATCACAA
GTGTAACAATGAATGCATGGAGAGTGTGAAAAATGGTACCTATGACTATCCAAAATATTCCGAAG
AATCAAAGTTAAACAGGGAGAAAATTGATGGAGTGAAATTGGAATCAATGGGAGTATACCAGATT
CTGGCGATCTACTCAACTGTGCGCAGTTCCCTGGTTCTTTTGGTCTCCCTGGGGGCAATCAGCT
TCTGGATGTGTTCCAATGGGTCTTTGCAGTGTAGAATATGCATCTAAGAGCTCTAAGTTAAAATG
CTTCTTCGTCTCCTATTTATAATATGGTTTGTTATTGTTAATTTTGTCTTGTAGAAGAGCTTAATT
AATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGTAATGTAATTCATTTACATAAG
TGGAGTCAGAATCAGAATGTTTCCTCCATAACTAAGTACATGAAGACCTGCCGCGTACAATTG
TCTTATATTTGAACAACTAAAATTGAACATCTTTGCCACAACCTTATAAGTGGTTAATATAGCTCA
AATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAATTCATTAACAATCAAC
TTAACGTTATTAACCTACTAATTTTATATCATCCCCTTTGATAAATGATAGTACA

Fig. 53

SEQ ID NO: 62

H1 from A/Brisbane/59/2007 (construct #774)

CTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAAAGTTAGCAAGTGTGTACAT
TTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAACATTAGAGTAAAGAAAT
ATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTGCAACATTTGAGAAAATTTT
GTTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAAGAGGGGAGAATAAAAAACA
TAATGTGAGTATGAGAGAGAAAGTTGTACAAAAGTTGTACCAAATAGTTGTACAAATATCATTGA
GGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAATAAGGATGACGCATTAGA
GAGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAGAAAGAAAGAATAAATTATTTTTAAATTA
AAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGT
ATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTTCCTATATATTGCCCCATA
GAGTCAGTTAACTCATTTTTATATTTTCATAGATCAAATAAGAGAAATAACGGTATATTAATCCCTCC
AAAAAAAAAAAAACGGTATATTTACTAAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCGTA
GGAGGATAACATCCAATCCAACCAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCCACG
CATCTGTGGCACATCTACATTATCTAAATCACACATTCTCCACACATCTGAGCCACACAAAAACC
AATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTC
AAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGAAAGTAAACT
ACTGGTCCTGTTATGCACATTTACAGCTACATATGCAGACACAATATGTATAGGCTACCATGCTAA
CAACTCGACCGACACTGTTGACACAGTACTTGAAAAGAATGTGACAGTGACACACTCTGTCAACC
TGCTTGAGAACAGTCACAATGGAAAATATGTCTATTAAGGAATAGCCCCACTACAATTGGGT
AATTGCAGCGTTGCCGGTGGATCTTAGGAAACCCAGAATGCGAATTACTGATTTCCAAGGAGTC
ATGGTCCTACATTGTAGAAAAACCAATCCTGAGAATGGAACATGTTACCCAGGGCATTTCGCTG
ACTATGAGGAACTGAGGGAGCAATTGAGTTCAGTATCTTCATTTGAGAGTTTCAAATATTTCCC
AAAGAAAGCTCATGGCCCAACCAACCGTAACCGGAGTGTGAGCATCATGCTCCCATAAATGGGG
AAAGCAGTTTTTACAGAAATTTGCTATGGCTGACGGGGAAGAATGGTTTGTACCCAAACCTGAGC
AAGTCCTATGCAAAACAACAAAGAAAAAGAGTCCTTGTACTATGGGGTGTTTCATCACCCGCCAAA
CATAGGTGACCAAAAAGGCCCTCTATCATACAGAAAATGCTTATGTCTCTGTAGTGTCTTCACATTA
TAGCAGAAAATCACCCAGAAATAGCCAAAAGACCCAAAGTAAGAGATCAAGAAGGAAGAATCA
ATTACTACTGGACTCTGCTTGAACCCGGGGATACAATAATTTGAGGCAAATGGAAATCTAATAG
CGCCAAGATATGCTTTCGCACTGAGTAGAGGCTTTGGATCAGGAATCATCAACTCAAATGCACCA
ATGGATAAATGTGATGCGAAGTGCCAAACACCTCAGGGAGCTATAACAGCAGTCTTCCTTTCCA
GAACGTACACCCAGTCACAATAGGAGAGTGTCCAAAGTATGTCAGGAGTGCAAAATTAAGGATG
GTTACAGGACTAAGGAACATCCCATCCATTCAATCCAGAGGTTTGTGTTGGAGCCATTGCCGTTT
CATTGAAGGGGGGTGGACTGGAATGGTAGATGGTTGGTATGGTTATCATCATCAGAATGAGCAA
GGATCTGGCTATGCTGCAGATCAAAAAGCACACAAAATGCCATTAATGGGATTACAAACAAGGT
CAATTCTGTAATTGAGAAAATGAACACTCAATTCACAGCAGTGGGCAAAGAGTTCAACAAATTGG
AAAGAAGGATGGAAAACCTTGAATAAAAAAGTTGATGATGGGTTTATAGACATTTGGACATATAATG
CAGAACTGTTGGTTCTACTGGAAAATGAAAGGACTTTGGATTTCCATGACTCCAATGTGAAGAAT
CTGTATGAGAAAGTAAAAAGCCAGTTAAGAATAATGCTAAAGAAATAGGAAATGGGTGTTTTGAG
TTCTATCACAAGTGTAACGATGAATGCATGGAGAGTGTAAGAATGGAACCTTATGACTATCCAAAA
TATTCGAAGAATCAAAGTTAAACAGGGAGAAAATTGATGGAGTGAAATTGGAATCAATGGGAGT
CTATCAGATTCTGGCGATCTACTCAACAGTCGCCAGTTCTCTGGTTCTTTTGGTCTCCCTGGGGG
CAATCAGCTTCTGGATGTGTTCCAATGGGTCTTTACAGTGTAGAATATGCATCTAAGAGCTCTAA
GTTAAAATGCTTCTTCGTCTCCTATTTATAATATGGTTTGTATTGTTAATTTTGTCTTGTAGAAGA
GCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGAATGTAATTCATT
TACATAAGTGGAGTCAGAATCAGAATGTTTCCTCCATAACTAACTAGACATGAAGACCTGCCGCG
TACAATTGCTTATATTTGAACAACATAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTAAT
ATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAATTCATTAA
CAATCAACTTAACGTTATTAATACTACTAATTTTATATCATCCCCTTGATAAATGATAGTACA

Fig. 54

SEQ ID NO: 63

H1 from A/Solomon Islands/3/2006 (H1N1) (Construct # 775)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTA
AGTTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCAT
TATTAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAAC
AATTTTGTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAG
AGAGAGAAAAAGGAAGAGGGGAGAATAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTAC
AAAAGTTGTACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATA
AGGGTTAATTGCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTT
TTGGCAAGTCATTAAAAAGAAAGAATAAATTATTTTTAAAATTTAAAGTTGAGTCATTTGATTA
AACATGTGATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAAT
TTGGTGTCAAATTTAATTTGACATTTGATCTTTTCTATATATTGCCCATAGAGTCAGTTAA
CTCATTTTTATATTTCATAGATCAAATAAGAGAAAATAACGGTATATTAATCCCTCCAAAAAAA
AAAAACGGTATATTTACTAAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCCGTAGG
AGGATAACATCCAATCCAACCAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCAC
GCATCTGTGGCACATCTACATTATCTAAATCACACATTCTTCCACACATCTGAGCCACACAA
AAACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTG
ATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAA
TGAAAGTAAACTACTGGTCCTGTTATGCACATTTACAGCTACATATGCAGACACAATATGT
ATAGGCTACCATGCCAACAACTCAACCGACACTGTTGACACAGTACTTGAGAAGAATGTGA
CAGTGACACACTCTGTCAACCTGCTTGAGGACAGTCACAATGGAAAATTATGTCTATTAATA
GGAATAGCCCCACTACAATTGGGTAAATGCAGCGTTGCCGGATGGATCTTAGGAAACCCA
GAATGCGAATTACTGATTTCCAGGGAATCATGGTCCTACATTGTAGAAAAACCAATCCTGA
GAATGGAACATGTTACCCAGGGCATTTCGCCGACTATGAGGAACTGAGGGAGCAATTGAG
TTCAGTATCTTCATTTGAGAGATTCGAAATATCCCCAAAGAAAGCTCATGGCCCAACCACA
CCACAACCGGAGTATCAGCATCATGCTCCATAATGGGGAAAGCAGTTTTTACAAAAATTT
GCTATGGCTGACGGGGAAGAATGGTTTGTACCCAAACCTGAGCAAGTCCTATGCAAACAA
CAAAGAGAAAGAAGTCCTTGTACTATGGGGTGTTCATCACCCGCCTAACATAGGTGACCAA
AGGGCTCTCTATCATAAAGAAAAATGCTTATGTCTCTGTAGTGTCTTCACATTATAGCAGAAA
ATTCACCCCAGAAATAGCCAAAAGACCCAAAGTAAGAGATCAAGAAGGAAGAATCAACTAC
TACTGGACTCTACTTGAACCCGGGGATACAATAATATTTGAGGCAAATGGAAATCTAATAGC
GCCAAGATATGCTTTCGCACTGAGTAGAGGCTTTGGATCAGGAATCATCAACTCAAATGCA
CCAATGGATGAATGTGATGCGAAGTGCCAAACACCTCAGGGAGCTATAAACAGCAGTCTTC
CTTCCAGAATGTACACCCTGTCACAATAGGAGAGTGTCCAAAGTATGTCAGGAGTGCAAA
ATTAAGGATGGTTACAGGACTAAGGAACATCCCATCCATTCAATCCAGAGGTTTGTGTTGA
GCCATTGCCGTTTCATTGAAGGGGGGTGGACTGGAATGGTAGATGGTTGGTATGGTTAT
CATCATCAGAATGAGCAAGGATCTGGCTATGCTGCAGATCAAAAAAGCACACAAAATGCCA
TTAATGGGATTACAAACAAGGTCAATTCTGTAAATTGAGAAAATGAACACTCAATTCACAGCT
GTGGGCAAAGAGTTCAACAAATTGGAAAGAAGGATGGAAAACCTTAAATAAAAAAGTTGATG
ATGGGTTTATAGACATTTGGACATATAATGCAGAAATTGTTGGTTCTACTGGAAATGAAAGG
ACTTTGGATTTCCATGACTCCAATGTGAAGAATCTGTATGAGAAAAGTAAAAAGCCAATTAAA
GAATAATGCCAAAGAAATAGGAAATGGGTGTTTTGAGTTCTATCATAAGTGTAAACGATGAAT
GCATGGAGAGTGTAAAAATGGAACCTTATGACTATCCAAAATATTCCGAAGAATCAAAGTTA
AACAGGGAGAAAATTGATGGAGTGAAATTGGAATCAATGGGAGTCTATCAGATTCTGGCGA
TCTACTCAACAGTCGCCAGTTCTCTGTTCTTTTGGTCTCCCTGGGGGCAATCAGCTTCTG
GATGTGTTCCAATGGGTCTTTGCAGTGTAGAATATGCATCTGAGAGCTCTAAGTTAAATGC
TTCTTCGTCTCCTATTTATAATATGGTTTGTATTGTTAATTTTGTCTTGTAGAAGAGCTTAA
TTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGTAAATGTAATTCATTTA
CATAAGTGGAGTCAGAATCAGAATGTTTCTCCATAACTAACTAGACATGAAGACCTGCCG
CGTACAATTGTCTTATATTTGAACAATAAAATTGAACATCTTTTCCACAACCTTTATAAGTG
GTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGA
AATTCATTAACAATCAACTTAACGTTATTAATACTACTAATTTTATATCATCCCTTTGATAAATG
ATAGTACA

Fig. 55

SEQ ID NO: 64

H2 from A/Singapore/1/57 (H2N2) (construct # 780)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAA
 GTTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTAT
 TAAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTT
 TGTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAG
 AAAAAGGAAGAGGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTG
 TACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAAT
 TGCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTC
 ATTAAGAAAGAAAGAATAAATTATTTTTAAAATTAAAAGTTGAGTCATTTGATTAACATGTGATT
 ATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAAT
 TTAATTTGACATTTGATCTTTTCTATATATTGCCCATAGAGTCAGTTAACTCATTTTTATATT
 TCATAGATCAAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAAAAAAAAAACGGTATATTT
 ACTAAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCCGTAGGAGGATAACATCCAATC
 CAACCAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCACATCT
 ACATTATCTAAATCACACATTCTTCCACACATCTGAGCCACACAAAAACCAATCCACATCTTTA
 TCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACA
 AAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGCCATCATTTATCTAATTC
 TCCTGTTACAGCAGTGAGAGGGGACCAATATGCATTGGATACCATGCCAATAATTCACACA
 GAGAAGGTCGACACAATTCTAGAGCGGAACGTCCTGTGACTCATGCCAAGGACATTCTTGA
 GAAGACCCATAACGGAAAGTTATGCAAATAACCGAATCCCTCCACTTGAAGTGGGGGACT
 GTAGCATTGCCGGATGGCTCCTTGGAATCCAGAATGTGATAGGCTTCTAAGTGTGCCAGAA
 TGGTCCTATATAATGGAGAAAGAAAACCCGAGAGACGGTTTGTGTTATCCAGGCAGCTTCAA
 TGATTATGAAGAATTGAAACATCTCCTCAGCAGCGTGAAACATTTGAGAGAAAGTAAAGATTCT
 GCCCAAAGATAGATGGACACAGCATACAACAACCTGGAGGTTACGCGGCCTGCGCGGTGTCT
 GGTAATCCATCATTCTTCAGGAACATGGTCTGGCTGACAAAGAAAGAATCAAATTATCCGGTT
 GCCAAAGGATCGTACAACAATACAAGCGGAGAAACAATGCTAATAATTTGGGGGGTGCACCA
 TCCCAATGATGAGACAGAACAAGAACATTGTACCAGAATGTGGGAACCTATGTTTCCGTAG
 GCACATCAACATTGAACAAAAGGTCAACCCAGACATAGCAACAAGGCCTAAAGTGAATGGA
 CTAGGAAGTAGAATGGAGTTCTCTTGACCCTATTGGATATGTGGGACACCATAAATTTTGAG
 AGTACTGGTAATCTAATTGCACCAGAGTATGGATTCAAATATCGAAAAGAGGTAGTTCAGGG
 ATCATGAAAACAGAAGGAACACTTGAGAACTGTGAGACCAAATGCCAACTCCTTTGGGAGC
 AATAAATACAACATTGCCTTTTCACAATGTCCACCCACTGACAATAGGTGAGTCCCCAAATA
 TGTAATCGGAGAAGTTGGTCTTAGCAACAGGACTAAGGAATGTTCCCGAGATTGAATCAA
 GAGGATTGTTTGGGGCAATAGCTGTTTTATAGAAGGAGGATGGCAAGGAATGGTTGATGGT
 TGGTATGGATACCATCACAGCAATGACCAGGGATCAGGGTATGCAGCAGACAAAGAATCCAC
 TCAAAAGGCATTTGATGGAATCACAACAAGGTAAATTCTGTGATTGAAAAGATGAACACCCA
 ATTTGAAGCTGTTGGGAAAGAGTTCACTAAGTATAGAGAGAAGACTGGAGAAGTTGAACAAAAA
 GATGGAAGACGGGTTTCTAGATGTGTGGACATACAATGCTGAGCTTCTAGTTCTGATGGAAA
 ATGAGAGGACACTTGACTTTTATGATTCTAATGTCAAGAATCTGTATGATAAAGTCAGAATGC
 AGCTGAGAGACAACGTCAAAGAACTAGGAAATGGATGTTTTGAATTTTATCACAAATGTGATG
 ATGAATGCATGAATAGTGTGAAAAACGGGACGTATGATTATCCCAAGTATGAAGAAGAGTCTA
 AACTAAATAGAAATGAAATCAAAGGGGTAAAATTGAGCAGCATGGGGGTTTATCAAATCCTTG
 CCATTTATGCTACAGTAGCAGGTTCTCTGTCACTGGCAATCATGATGGCTGGGATCTCTTTCT
 GGATGTGCTCCAACGGGTCTCTGCAGTGCAGGATCTGCATATGAGAGCTCTAAGTTAAAATG
 CTTCTTCGTCTCCTATTTATAATATGTTTTGTTATTGTTAATTTTGTCTTGTAGAAGAGCTTAA
 TTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGTAAATGTAATTCATTTACA
 TAAGTGGAGTCAGAATCAGAATGTTTCTCCATAACTAACTAGACATGAAGACCTGCCGCGTA
 CAATTGTCTTATATTTGAACAATAAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTAAT
 ATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAATTCAT
 TAACAATCAACTTAACGTTATTAATACTAATTTTATATCATCCCCTTTGATAAATGATAGTACA

Fig. 56

SEQ ID NO: 65

H5 from A/Anhui/1/2005 (H5N1) (Construct# 781)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAAAG
TTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATT
AAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTT
GTTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGA
AAAAGGAAGAGGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTGT
ACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATT
GCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCA
TTAAAAAGAAAGAATAAATTATTTTTAAAATTTAAAGTTGAGTCATTTGATTAACATGTGATTAT
TTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTA
ATTTGACATTTGATCTTTTCTATATATTGCCCCATAGAGTCAGTTAACTCATTTTTATATTTTCAT
AGATCAAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAACCGGTATATTTACTA
AAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCGTAGGAGGATAACATCCAATCCAAC
CAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCACATCTACAT
TATCTAAATCACACATTCTCCACACATCTGAGCCACACAAAAACCAATCCACATCTTTATCAC
CCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGA
GAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGAGAAAATAGTGCTTCTTCTTGC
AATAGTCAGCCTTGTTAAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCGACAGA
GCAGGTTGACACAATAATGGAAAAGAACGTTACTGTTACACATGCCCAAGACATACTGGAAAA
GACACACAACGGGAAGCTCTGCGATCTAGATGGAGTGAAGCCTCTGATTTTAAGAGATTGTA
GTGTAGCTGGATGGCTCCTCGGAAACCCAATGTGTGACGAGTTCATCAATGTGCCGGAATGG
TCTTACATAGTGGAGAAGGCCAACCAGCCAATGACCTCTGTTACCCAGGGAATTTCAACGA
CTATGAAGAACTGAAACACCTATTGAGCAGAATAAACCATTTTGAGAAAATTCAGATCATCCCC
AAAAGTTCTTGGTCCGATCATGAAGCCTCATCAGGGGTCAGCTCAGCATGTCCATACCAGGG
AACGCCCTCCTTTTTCAGAAATGTGGTATGGCTTATCAAAAAGAACAAATACATACCCAACAATA
AAGAGAAGCTACAATAATACCAACCAGGAAGATCTTTTGATACTGTGGGGGATTTCATTCT
AATGATGCGGCAGAGCAGACAAAGCTCTATCAAAACCCAACCACCTATATTTCCGTTGGGACA
TCAACACTAAACCAGAGATTGGTACCAAAAATAGCTACTAGATCCAAAGTAAACGGGCAAAAGT
GGAAGGATGGATTTCTTCTGGACAATTTTAAACCGAATGATGCAATCAACTTCGAGAGTAAT
GGAATTTTCATTGCTCCAGAATATGCATACAAAATTTGCAAGAAAGGGGAGCTCAGCAATTTGT
AAAAGTGAAGTGAATATGGTAACTGCAATACAAAGTGTCAAACTCCAATAGGGGCGATAAAC
TCTAGTATGCCATTCCACAACATACACCCTCTCACCATCGGGGAATGCCCAATATGTGAAA
TCAAACAAATTAGTCCTTGGCGACTGGGCTCAGAAATAGTCCTCTAAGAGAAAAGAAGAAGAAA
AGAGGACTATTTGGAGCTATAGCAGGGTTTATAGAGGGAGGATGGCAGGGAATGGTAGATGG
TTGGTATGGGTACCACCATAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCA
CTCAAAGGCAATAGATGGAGTCACCAATAAGGTCAACTCGATCATTGACAAAATGAACACTC
AGTTTGAGGCCGTTGGAAGGGAATTTAATAACTTAGAAAGGAGAATAGAGAATTTAACAAGA
AAATGGAAGACGGATTCTAGATGTCTGGACTTATAATGCTGAACCTCTGGTTCTCATGGAAA
ATGAGAGAACTCTAGACTTCCATGATTCAAATGTCAAGAACCTTTACGACAAGGTCCGACTAC
AGCTTAGGGATAATGCAAAGGAGCTGGGTAACGGTTGTTTCGAGTTCTATCACAAATGTGATA
ATGAATGTATGAAAAGTGTAAAGAAACGGAACGTATGACTACCCGCAAGTATTCAGAAGAAGCAA
GATTAAGGAGAGAGGAAATAAGTGGAGTAAAATTGGAATCAATAGGAACCTTACCAATACTGT
CAATTTATTCAACAGTTGCGAGTTCTCTAGCACTGGCAATCATGGTGGCTGGTCTATCTTTGT
GGATGTGCTCCAATGGGTCGTTACAATGCAGAATTTGCATTTAAGAGCTCTAAGTTAAAATGC
TTCTTCGTCTCCTATTTATAATATGGTTTGTTATTGTTAATTTTGTCTTGTAGAAGAGCTTAATT
AATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGTAAATGTAATTCATTTACATA
AGTGGAGTCAGAATCAGAATGTTTCCTCCATAACTAAGTACATGAAGACCTGCCGCGTACA
ATTGTCTTATATTTGAACAACTAAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTAATAT
AGCTCAAATATATGGTCAAGTTCAATAGATTAAATAATGGAATATCAGTTATCGAAATTCATTAA
CAATCAACTTAACGTTATTAATACTAATTTTATATCATCCCTTTGATAAATGATAGTACA

Fig. 57

SEQ ID NO: 66

H5 from A/Vietnam/1194/2004 (H5N1) (Construct # 782)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAAG
TTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATT
AAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTT
GTTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGA
AAAAGGAAGAGGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTGT
ACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATT
GCTGTAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCA
TTAAAAAGAAAGAATAAATTATTTTTAAATTAAGTTGAGTCATTTGATTAAACATGTGATTAT
TTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTA
ATTTGACATTTGATCTTTTCCTATATATTGCCCATAGAGTCAGTTAACTCATTTTTATATTTTAT
AGATCAAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAAAGGATATTTTACTA
AAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCGTAGGAGGATAACATCCAATCCAAC
CAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCACATCTACAT
TATCTAAATCACACATTCTTCCACACATCTGAGCCACACAAAAACCAATCCACATCTTTATCAC
CCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGA
GAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGAGAAAATAGTGCTTCTTTTTGC
AATAGTCAGTCTTGTTAAAGTGATCAGATTTGCATTGGTTACCATGCAAACAACCTCGACAGA
GCAGGTTGACACAATAATGGAAAAGACGTTACTGTTACACATGCCCAAGACATACTGAAAAA
GACACACAATGGGAAGCTCTGCGATCTAGATGGAGTGAAGCCTCTAATTTTGAGAGATTGTAG
TGTAGCTGGATGGCTCCTCGGAAACCCAATGTGTGACGAGTTCATCAATGTGCCGGAATGGT
CTTACATAGTGGAGAAGGCCAATCCAGTCAATGACCTCTGTTACCCAGGGGATTTCATGACT
ATGAAGAATTGAAACACCTATTGAGCAGAATAAACCATTTTGAGAAAATTCAGATCATCCCCAA
AAGTTCTTGGTCCAGTCATGAAGCCTCATTGGGGGTGAGCTCAGCATGTCCATACCAGGGAA
AGTCCTCCTTTTTCAGAAATGTGGTATGGCTTATCAAAAAGAACAGTACATACCCAACAATAAA
GAGGAGCTACAATAATACCAACCAAGAAGATCTTTTGGTACTGTGGGGGATTACCATCCTAA
TGATGCGGCAGAGCAGACAAAGCTCTATCAAAACCCAACCACCTATATTTCCGTTGGGACATC
TACACTAAACCAGAGATTGGTACCAAGAATAGCTACTAGATCCAAAGTAAACGGGGCAAAGTGG
AAGGATGGAGTTCTTCTGGACAATTTTAAACCGAATGATGCAATCAACTTCGAGAGTAATGG
AAATTTTATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGGGGACTCAACAATTATGAAA
AGTGAATTGGAATATGGTAACTGCAATACCAAGTGTCAAACCTCAATGGGGGCGATAAACTCT
AGCATGCCATTCCACAATATACACCCTCTCACCATCGGGGAATGCCCAAATATGTGAAATCA
AACAGATTAGTCCTTGGGACTGGGCTCAGAAATAGCCCTCAAAGAGAGAGAAGAAGAAAAA
GAGAGATTATTTGGAGCTATAGCAGTTTTATAGAGGGAGGATGGCAGGGAATGGTAGATG
GTTGGTATGGGTACCACCATAGCAACGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATC
CACTCAAAAGGCAATAGATGGAGTCACCAATAAGGTCAACTCGATTATTGACAAAATGAACAC
TCAGTTTGAGGCCGTTGGAAGGGAATTTAACTTAGAAAGGAGAATAGAGAATTTAAACAA
GAAGATGGAAGACGGGTTCTAGATGTCTGGACTTATAATGCTGAACTTCTAGTTCTCATGGA
AAACGAGAGAACTCTAGACTTTTATGACTCAAATGTCAAGAACCTTTACGACAAGGTCCGACT
ACAGCTTAGGGATAATGCAAAGGAGCTGGGTAAACGGTTGTTTCGAGTTCTATCATAAATGTGA
TAATGAATGTATGGAAAGTGTAAGAAACGGAACGTATGACTACCCGAGTATTGAGAAGAAGC
AAGACTAAAAAGAGAGGAAATAAGTGGAGTAAATTTGGAATCAATAGGAATTTACCAATATTG
TCAATTTATTCTACAGTGGCCAGCTCCCTAGCACTGGCAATCATGGTAGCTGGTCTATCCTTA
TGGATGTGCTCCAATGGGTCGTTACAATGCAGAATTTGCATTTAAGAGCTCTAAGTTAAAATG
CTTCTTCGTCTCCTATTTATAATATGGTTTGTATTGTTAATTTTGTCTTGTAGAAGAGCTTAA
TTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGTAAATGTAATTCATTTACA
TAAGTGGAGTCAGAATCAGAATGTTTCTCCATAACTAACTAGACATGAAGACCTGCCGCGTA
CAATTGTCTTATATTTGAACAATAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTAAT
ATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAATTCATT
ACAATCAACTTAACGTTATTAATACTACTAATTTTATATCATCCCTTTGATAAATGATAGTACA

Fig. 58

SEQ ID NO: 67

H6 from A/Teal/Hong Kong/W312/97 (H6N1) (Construct # 783)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTA
AGTTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCAT
TATTAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACA
ATTTTGTGCAACATTTGAGAAAAATTTGTTGTTCTCTCTTTTCATTGGTCAAAAACAATAGA
GAGAGAAAAAGGAAGAGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAGTTGTACA
AAAGTTGTACCAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAA
GGGTTAATTGCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTT
TGGCAAGTCATTAAGAAAGAAAGAATAAATTATTTTTAAAATTAAGTTGAGTCATTTGATTAA
ACATGTGATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATT
TGGTGTCAAATTTAATTTGACATTTGATCTTTTCCCTATATATTGCCCCATAGAGTCAGTTAAC
TCATTTTTATATTTTATAGATCAAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAA
AAACGGTATATTTACTAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCGTAGGAG
GATAACATCCAATCCAACCAATCACACAATCCTGATGAGATAACCCACTTTAAGCCCACGC
ATCTGTGGCACATCTACATTATCTAAATCACACATTCTCCACACATCTGAGCCACACAAAA
ACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGAT
TCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATG
ATTGCAATCATTGTAATAGCAATACTGGCAGCAGCCGGAAGTCAGACAAGATCTGCATTG
GGTATCATGCCAACAATTCAACAACACAGGTAGATACGATACTTGAGAAGAATGTGACTGT
CACACACTCAATTGAATTGCTGGAAAATCAGAAGGAAGAAAGATTCTGCAAGATATTGAACA
AGGCCCTCTCGACTTAAGGGAATGTACCATAGAGGGTTGGATCTTGGGGAATCCCAAT
GCGACCTATTGCTTGGTGATCAAAGCTGGTCATACATTGTGGAAAGACCTACTGCTCAAAA
CGGGATCTGCTACCCAGGAACCTTAATGAGGTAGAAGAACTGAGGGCACTTATTGGATCA
GGAGAAAGGGTAGAGAGATTTGAGATGTTTCCCCAAAGCACCTGGCAAGGAGTTGACACC
AACAGTGGAAACAACAAGATCCTGCCCTTATTCTACTGTTGCGTCTTTCTACAGAAACCTCCT
ATGGATAATAAAAAACCAAGACAGCAGAATATCCAGTAATTAAGGGAATTTACAACAACACTG
GAACCCAGCCAATCCTCTATTTCTGGGGTGTGCATCATCCTCCTAACACCGACGAGCAAGA
TACTCTGTATGGCTCTGGTGATCGATACGTTAGAATGGGAAGTGAAGCATGAATTTTGCCA
AGAGTCCGGAATTTGCGGCAAGGCCTGCTGTGAATGGACAAAGAGGCAGAATTGATTATTA
TTGGTCGGTTTTAAACCAGGGGAAACCTTGAATGTGGAATCTAATGGAAATCTAATCGCC
CCTTGGTATGCATACAAATTTGTCAACACAAATAGTAAAGGAGCCGTCTTCAGGTCAGATTT
ACCAATCGAGAACTGCGATGCCACATGCCAGACTATTGCAGGGGTTCTAAGGACCAATAAA
ACATTTGAGAATGTGAGTCCCCTGTGGATAGGAGAATGTCCCAAATACGTGAAAAGTGAAA
GTCTGAGGCTTGCAACTGGAATAAGAAATGTTCCACAGATTGAACTAGAGGACTCTTCGG
AGCTATTGCAGGGTTTATTGAAGGAGGATGGACTGGGATGATAGATGGGTGGTATGGCTAT
CACCATGAAAATTCTCAAGGGTCAGGATATGCAGCAGACAGAGAAAGCACTCAAAGGCTG
TAAACAGAATTACAAATAAGGTCAATTCATCATCAACAAATGAACACACAATTTGAAGCTG
TCGATCACGAATTTTCAAATCTGGAGAGGAGAATTGACAATCTGAACAAAAGAATGCAAGAT
GGATTTCTGGATGTTTGGACATACAATGCTGAACTGTTGGTTCTTCTTGAAAACGAAAGAAC
ACTAGACATGCATGACGCAAATGTGAAGAACCTACATGAAAAGGTCAAATCACAACTAAGG
GACAATGCTACGATCTTAGGGAATGGTTGCTTTGAATTTTGGCATAAGTGTGACAATGAATG
CATAGAGTCTGTCAAAAATGGTACATATGACTATCCCAATACCAGACTGAAAGCAAATTA
ACAGGCTAAAAATAGAATCAGTAAAGCTAGAGAACCTTGGTGTGTATCAAATCTTGCCATT
TATAGTACGGTATCGAGCAGCCTAGTGTTGGTAGGGCTGATCATGGCAATGGGTCTTTGGA
TGTGTTCAAATGGTTCAATGCAGTGCAGGATATGTATATAAGAGCTCTAAGTTAAATGCTT
CTTCGTCTCCTATTTATAATATGGTTTGTTATTGTTAATTTTGTCTTGTAAGAGCTTAATT
AATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGAATGTAATTCATTTACA
TAAGTGGAGTCAAGATCAGAATGTTTCTCCATACTAAGTACATGAAGACCTGCCGCG
TACAATTGCTTATATTTGAACAACATAAAATGAACATCTTTGCCACAACCTTTAATGAGGTT
AATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAAT
TCATTAACAATCACTTAACGTTATTAACCTACTAATTTTATATCATCCCCTTTGATAAATGATA
GTACA

Fig. 59

SEQ ID NO: 68

H9 from A/Hong Kong/1073/99 (H9N2) (Construct # 785)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAA
GTTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATT
TTAAACATTAGAGTAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAAT
TTTGTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAG
AGAAAAAGGAAGAGGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAGTTGTACAAAAG
TTGTACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGT
TAATTGCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCA
AGTCATTA AAAAGAAAGAATAAATTATTTTTAAAATTAAGTTGAGTCATTTGATTAACATG
TGATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGT
CAAATTTAATTTGACATTTGATCTTTTCTATATATTGCCCATAGAGTCAGTTAACTCATTTT
TATATTTCATAGATCAAATAAGAGAAAATAACGGTATATTAATCCCTCCAAAAA AAAAAACGG
TATATTTACTAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCCGTAGGAGGATAACA
TCCAATCCAACCAATCACAACAATCTGATGAGATAACCCACTTTAAGCCCACGCATCTGTG
GCACATCTACATTATCTAAATCACACATTCTTCCACACATCTGAGCCACACAAAAACCAATCC
ACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAA
ACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGAACAATA
TACTAATAACTATACTACTAGTAGTAACAGCAAGCAATGCAGATAAAATCTGCATCGGCCA
CCAGTCAACAACTCCACAGAACTGTGGACACGCTAACAGAAACCAATGTTCTGTGACAC
ATGCCAAAGAATTGCTCCACACAGAGCATAATGGAATGCTGTGTGCAACAAGCCTGGGACA
TCCCCTCATTCTAGACACATGCACTATTGAAGGACTAGTCTATGGCAACCCTTCTTGTGACC
TGCTGTTGGGAGGAAGAGAATGGTCCTACATCGTCGAAAGATCATCAGCTGTAAATGGAAC
GTGTTACCCTGGGAATGTAGAAAACCTAGAGGAACCTCAGGACACTTTTTAGTTCCGCTAGTT
CCTACCAAAGAATCCAAATCTTCCAGACACAACCTGGAATGTGACTTACACTGGAACAAGC
AGAGCATGTT CAGGTTCAATTCTACAGGAGTATGAGATGGCTGACTCAAAAGAGCGGTTTTTA
CCCTGTTCAAGACGCCCAATACACAAATAACAGGGGAAAGAGCATTCTTTTCGTGTGGGGC
ATACATCACCCACCCACCTATACCGAGCAAACAAATTTGTACATAAGAAACGACACAACAAC
AAGCGTGACAACAGAAGATTTGAATAGGACCTTCAAACCAGTGATAGGGCCAAGGCCCTT
GTCAATGGTCTGCAGGGAAGAATTGATTATTATTGGTCGGTACTAAAACCAGGCCAAACATT
GCGAGTACGATCCAATGGGAATCTAATTGCTCCATGGTATGGACACGTTCTTTCAGGAGGG
AGCCATGGAAGAATCCTGAAGACTGATTTAAAGGTGGTAATTGTGTAGTGCAATGTCAGAC
TGAAAAAGGTGGCTTAACAGTACATTGCCATTCCACAATATCAGTAAATATGCATTTGGAAC
CTGCCCCAAATATGTAAGAGTTAATAGTCTCAAACCTGGCAGTCGGTCTGAGGAACGTGCCT
GCTAGATCAAGTAGAGGACTATTTGGAGCCATAGCTGGATT CATAGAAGGAGGTTGGCCAG
GACTAGTCGCTGGCTGGTATGGTTTCCAGCATTCAAATGATCAAGGGGTTGGTATGGCTGC
AGATAGGGATTCAACTCAAAGGCAATTGATAAAATAACATCCAAGGTGAATAATATAGTCGA
CAAGATGAACAAGCAATATGAAATAATTGATCATGAATTTAGTGAGGTTGAAACTAGACTCAA
TATGATCAATAATAAGATTGATGACCAAATACAAGACGTATGGGCATATAATGCAGAATTGCT
AGTACTACTTGAAAATCAAAAAACACTCGATGAGCATGATGCGAACGTGAACAATCTATATAA
CAAGGTGAAGAGGGCACTGGGCTCCAATGCTATGGAAGATGGGAAAGGCTGTTTCGAGCTA
TACCATAAATGTGATGATCAGTGCATGGAAACAATTCGGAACGGGACCTATAATAGGAGAAA
GTATAGAGAGGAATCAAGACTAGAAAGGCAGAAAATAGAGGGGGTTAAGCTGGAATCTGAG
GGAAC TTACAAAATCCTCACCATTTATTGACTGTCGCCTCATCTCTTGTGCTTGAATGGG
GTTTGCTGCCTTCTGTTCTGGGCCATGTCCAATGGATCTTGCAGATGCAACATTTGTATAT
AAGAGCTCTAAGTTAAAATGCTTCTTCTCTCTATTTATAATATGGTTTGTATTGTTAATTT
TGTTCTTGTAGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACT
GGTGTAAATGTAATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCCTCCATAACTAACT
AGACATGAAGACCTGCCGCGTACAATTGTCTTATATTTGAACAACATAAATTGAACATCTTTT
GCCACAAC TTTATAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAAT
GGAAATATCAGTTATCGAAATTCATTAACAATCAACTTAACGTTATTA ACTACTAATTTTATAT
CATCCCCTTTGATAAATGATAGTACA

Fig. 60

SEQ ID NO: 69

H3 from A/Brisbane/10/2007 (H3N2)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAAGT
TAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAA
ACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTT
GCAACATTTGAGAAAATTTTGTTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAA
GGAAGAGGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTGTACCAA
AATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTA
AATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAAAAG
AAAGAATAAATTATTTTTAAAAATTTAAAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAAT
TGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATT
TGATCTTTTCTATATATTGCCCCATAGAGTCAGTTAACTCATTTTTATATTTTCATAGATCAAATA
AGAGAAATAACGGTATATTAATCCCTCCAAAAAACCGGTATATTTACTAAAAATCTAAG
CCACGTAGGAGGATAACAGGATCCCCGTAGGAGGATAACATCCAATCCAACCAATCACAACAA
TCCTGATGAGATAACCCACTTTAAGCCCACGCATCTGTGGCACATCTACATTATCTAAATCACA
CATTCTTCCACACATCTGAGCCACACAAAAACCAATCCACATCTTTATCACCCATTCTATAAAAA
ATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAA
TTAATTAATCATCTTGAGAGAAAATGAAGACTATCATTGCTTTGAGCTACATTCTATGTCTGGTT
TTCCTCAAAAACCTCCCGGAAATGACAACAGCACGGCAACGCTGTGCCTGGGCACCATGCA
GTACCAAACGGAACGATAGTGAAAACAATCACGAATGACCAAATTGAAGTTACTAATGCTACTG
AGCTGGTTCAGAGTTCCTCAACAGGTGAAATATGCGACAGTCCTCATCAGATCCTTGATGGAG
AAAAGTGCACACTAATAGATGCTCTATTGGGAGACCCTCAGTGTGATGGCTTCCAAAATAAGAA
ATGGGACCTTTTTGTTGAACGCAGCAAAGCCTACAGCAACTGTTACCCTTATGATGTGCCGGAT
TATGCCTCCCTTAGGTCACTAGTTGCCTCATCCGGCACACTGGAGTTTAACAATGAAAGTTTCA
ATTGGACTGGAGTCACTCAAAACGGAACAAGCTCTGCTTGCATAAGGAGATCTAATAACAGTTT
CTTTAGTAGATTGAATTGGTTGACCCACTTAAATTTCAAATACCCAGCATTGAACGTGACTATGC
CAAACAATGAAAAATTTGACAAATTGTACATTTGGGGGGTTTACCACCCGGGTACGGACAATGA
CCAAATCTTCTGTATGCTCAAGCATCAGGAAGAATCACAGTCTCTACCAAAGAAGCCAACAA
ACTGTAATCCCGAATATCGGATCTAGACCCAGAGTAAGGAATATCCCCAGCAGAATAAGCATCT
ATTGGACAATAGTAAAACCGGGAGACATACTTTTGATTAACAGCACAGGGAATCTAATTGCTCC
TAGGGGTTACTTCAAAATACGAAGTGGGAAAAGCTCAATAATGAGATCAGATGCACCCATTGG
CAAATGCAATTCTGAATGCATCACTCCAAACGGAAGCATTCCCAATGACAAACCATTCCAAAT
GTAAACAGGATCACATACGGGGCCTGTCCCAGATATGTTAAGCAAAACACTCTGAAATTGGCA
ACAGGGATGCGAAATGTACCAGAGAAACAACTAGAGGCATATTTGGCGCAATCGCGGGTTTC
ATAGAAAATGGTTGGGAGGGAATGGTGGATGGTTGGTATGGTTTCAGGCATCAAATTTCTGAG
GGAATAGGACAAGCAGCAGATCTCAAAGCACTCAAGCAGCAATCGATCAAATCAATGGGAAG
CTGAATAGGTTGATCGGGAAAACCAACGAGAAATTCATCAGATTGAAAAAGAGTTCTCAGAAG
TCGAAGGGGAGAAATCCAGGACCTTGAGAAATATGTTGAGGACACCAAAATAGATCTCTGGTCAT
ACAACGCGGAGCTTCTTGTTGCCCTGGAGAACCAACATACAATTGATCTAACTGACTCAGAAAT
GAACAAACTGTTTGAAAAACAAAGAAGCAACTGAGGGAAAATGCTGAGGATATGGGCAATGG
TTGTTTCAAAATATACCACAAATGTGACAATGCCTGCATAGGATCAATCAGAAATGGAACCTTATG
ACCACGATGTATACAGAGATGAAGCATTAAACAACCGGTTCCAGATCAAGGGCGTTGAGCTGA
AGTCAGGATACAAAGATTGGATACTATGGATTTCTTTGCCATATCATGTTTTTGTCTTGTGTT
GCTTTGTTGGGGTTCATCATGTGGGCCTGCCAAAAGGCAACATTAGGTGCAACATTTGCATTT
GAGAGCTCTAAGTTAAATGCTTCTTCTCTCTATTTATAATATGGTTTGTATTGTTAATTTTG
TTCTTGTAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACGGT
GTAATGTAATTCATTACATAAGTGGAGTCAGATCAGAATGTTTCTCCATACTAACTAGACA
TGAAGACCTGCCGCTACAATTGTCTTATATTTGAACAACATAAAATTGAACATCTTTGCCACAA
CTTTATAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCA
GTTATCGAAATTCATTAACAATCAACTTAACGTTATTAACCTACTAATTTTATATCATCCCCCTTGA
TAAATGATAGTACA

Fig. 61

SEQ ID NO: 70

H3 from A/Wisconsin/67/2005 (H3N2)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAA
GTTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATT
TTAAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAAT
TTTGTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAG
AGAAAAAGGAAGAGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAGTTGTACAAAAG
TTGTACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGT
TAATTGCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCA
AGTCATTA AAAAGAAAGAATAAATTATTTTTAAAATTTAAAGTTGAGTCATTTGATTAAACATGT
GATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTC
AAATTTAATTTGACATTTGATCTTTTCTATATATTGCCCATAGAGTCAGTTAACTCATTTTTA
TATTTCATAGATCAAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAAAAAAAAAACGGTAT
ATTTACTAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCGTAGGAGGATAACATCC
AATCCAACCAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCA
CATCTACATTATCTAAATCACACATTCTTCCACACATCTGAGCCACACAAAAACCAATCCACA
TCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACA
CATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAAATGAAGACTATCATT
GCTTTGAGCTACATTCTATGTCTGGTTTTCACTCAAAAACCTCCCGGAAATGACAACAGCAC
GGCAACGCTGTGCCTTGGGCACCATGCAGTACCAACCGGAACGATAGTGA AAAACAATCACG
AATGACCAAATTGAAGTTACTAATGCTACTGAGCTGGTTCAGAGTTCCTCAACAGGTGGAAT
ATGCGACAGTCCTCATCAGATCCTTGATGGAGAAAACCTGCACACTAATAGATGCTCTATTGG
GAGACCTCAGTGTGATGGCTTCCAAAATAAGAAATGGGACCTTTTTGTTGAACGCAGCAAA
GCCTACAGCAACTGTTACCTTATGATGTGCCGATTATGCCTCCCTTAGGTCACTAGTTGC
CTCATCCGGCACACTGGAGTTTAACGATGAAAGTTTCAATTGGACTGGAGTCACTCAAAATG
GAACAAGCTCTGCTTGCAAAAGGAGATCTAATAACAGTTTCTTTAGTAGATTGAATTGGTTGA
CCCATTAAAAATCAAATACCCAGCATTGAACGTGACTATGCCAAACAATGAAAAATTTGACA
AATTGTACATTTGGGGGTTTACCACCCGGGTACGGACAATGACCAAATCTTCTGCATGCT
CAAGCATCAGGAAGAATCACAGTCTCTACCAAAAGGAAGCCAACAACCTGTAATCCCGAATAT
CGGATCTAGACCCAGAATAAGGAATATCCCCAGCAGAATAAGCATCTATTGGACAATAGTAA
AACCGGGAGACATACTTTTGATTAACAGCACAGGGAATCTAATTGCTCCTAGGGGTTACTTC
AAAATACGAAGTGGGAAAAGCTCAATAATGAGATCAGATGCACCCATTGGCAAATGCAATTC
TGAATGCATCACTCCAAATGGAAGCATTCCCAATGACAAACCATTTCAAAATGTAAACAGGAT
CACATATGGGGCCTGTCCCAGATATGTTAAGCAAAACACTCTGAAATTGGCAACAGGGATGC
GAAATGTACCAGAGAAACAACTAGAGGCATATTTGGCGCAATCGCGGGTTTCATAGAAAAT
GGTTGGGAGGGAATGGTGGATGGTTGGTACGGTTTCAGGCATCAAAATCTGAGGGAATAG
GACAAGCAGCAGATCTCAAAAGCACTCAAGCAGCAATCAATCAATCAATGGGAAGCTGAAT
AGGTTGATCGGGAAAACCAACGAGAAATTCATCAGATTGAAAAAGAGTTCTCAGAAGTAGA
AGGGAGAATCCAGGACCTCGAGAAATATGTTGAGGACACTAAAATAGATCTCTGGTCATACA
ACGCGGAGCTTCTTGTTGCCCTGGAGAACCAACATACAATTGATCTAACTGACTCAGAAATG
AACAACTGTTTGAAAGAACAAGAAGCAACTGAGGGAAAATGCTGAGGATATGGGCAATGG
TTGTTTCAAAATATACCACAAATGTGACAATGCCTGCATAGGATCAATCAGAAATGGAACCTTA
TGACCATGATGTATACAGAGATGAAGCATTAAACAACCGGTTCCAGATCAAAGGCGTTGAGC
TGAAGTCAGGATACAAAGATTGGATACTATGGATTTCTTTGCCATATCATGTTTTTTGCTTT
GTGTTGCTTTGTTGGGGTTTCATCATGTGGGCCTGCCAAAAGGCAACATTAGGTGCAACATT
TGCATTTGAGAGCTCTAAGTTAAATGCTTCTTCGTCTCCTATTTATAATATGGTTTGTTATTG
TTAATTTTGTCTTTGTAGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAG
ATGAACTGGTGTAAATGTAATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCCTCCATA
ACTAACTAGACATGAAGACCTGCCGCGTACAATTGTCTTATATTTGAACAACATAAAATGAAC
ATCTTTTGCCACAACCTTTATAAGTGGTTAATATAGCTCAAAATATATGGTCAAGTTCAATAGATT
ATAATGGAAATATCAGTTATCGAAATTCATTAACAATCAACTTAACGTTATTAACCTACTAATTT
TATATCATCCCCCTTTGATAAATGATAGTACA

Fig. 62

SEQ ID NO: 71

H7 from A/Equine/Prague/56 (H7N7)

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAAG
TTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATT
AAACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTT
GTTGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGA
AAAAGGAAGAGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAGTTGTACAAAAGTTGT
ACCAAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATT
GCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCA
TTAAAAAGAAAGAATAAATTATTTTTAAAATTAAGTTGAGTCATTTGATTAAACATGTGATTAT
TTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTA
ATTTGACATTTGATCTTTTCTATATATTGCCCCATAGAGTCAGTTAACTCATTTTTATATTTCA
TAGATCAAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAAAAAAAAAACGGTATATTTACT
AAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCCGTAGGAGGATAACATCCAATCCAA
CCAATCACAACAATCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCACATCTACA
TTATCTAAATCACACATTCTTCCACACATCTGAGCCACACAAAAACCAATCCACATCTTTATCA
CCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAG
AGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAAATGAACACTCAAATTTCTAATATTAG
CCACTTCGGCATTCTTCTATGTACGTGCAGATAAAATCTGCCTAGGACATCATGCTGTGTCTA
ATGGAACCAAAGTAGACACCCTTACTGAAAAAGGAATAGAAGTTGTCAATGCAACAGAAACAG
TTGAACAAACAAACATCCCTAAGATCTGCTCAAAAGGAAAAACAGACTGTTGACCTTGGTCAAT
GTGGATTACTAGGGACCGTTATTGGTCTCCCAATGTGACCAATTTCTTGAGTTCTCTGCTA
ATTTAATGATTTGAAAGAAGGGAAGGTAATGACATTTGTTATCCAGGCAAATTTGACAATGAAGA
AACAATTGAGAAAAATACTCAGAAAAATCCGGAGGAATTAAGGAGGAATATGGGATTACATA
TACCGGAGTGAGAACCAATGGAGAGACTAGCGCATGTAGAAGGTCAAGATCTTCCTTTTATG
CAGAGATGAAATGGCTTCTATCCAGCACAGACAATGGGACATTTCCACAAATGACAAAGTCTT
ACAAGAACACTAAGAAGGTACCAGCTCTGATAATCTGGGGAATCCACCACTCAGGATCAACT
ACTGAACAGACTAGATTATATGGAAGTGGGAATAAATTGATAACAGTTTGGAGTTCCAAATAC
CAACAATCTTTTGTCCCAATCCTGGACCAAGACCGCAAATGAATGGTCAATCAGGAAGAATT
GACTTTCACTGGCTGATGCTAGATCCCAATGATACTGTCACATTTAGTTTAAATGGGGCCTTT
ATAGCACCTGACCGCGCCAGTTTTCTAAGAGGTAAATCTCTAGGAATCCAAAGTGATGCACAA
CTTGACAATAATTGTGAAGGTGAATGCTATCATATTGGAGGTACTATAATTAGCAACTTGCCCT
TTCAAACATTAATAGTAGGGCAATCGGAAAATGCCCCAGATACGTGAAGCAGAAGAGCTTAA
TGCTAGCAACAGGAATGAAAAATGTTCTGAAGCTCCTGCACATAAACAATACTCATCACA
TGCGCAAAAAAAGAGGTTTTATTTGGTGAATAGCAGGATTCATTGAAAATGGGTGGGAAGGAT
TAATAGACGGATGGTATGGATATAAGCATCAGAATGCACAAGGAGAAGGGACTGCTGCAGAC
TACAAAAGTACACAATCTGCTATCAACCAAAATAACCGGAAAATTGAACAGACTAATAGAAAAAA
CCAACCAGCAATTCGAATAATAGATAATGAGTTCAATGAAATAGAAAAACAAATTGGCAATGT
TATTAAGTGGACTAGAGATTCTATCATCGAAGTATGGTCATATAATGCAGAGTTCCTCGTAGC
AGTGGAGAATCAACACACTATTGATTTAACTGACTCAGAAATGAACAACTATATGAAAAGGTA
AGAAGACAACCTGAGAGAAAATGCTGAGGAAGATGGTAATGGCTGTTTTGAAATATTCACCAA
TGTGACAATGATTGCATGGCCAGCATTAGAAACAACACATATGACCATAAAAAATACAGAAAA
GAGGCAATACAAAACAGAATCCAGATTGACGCAGTAAAGTTGAGCAGTGGTTACAAAGATATA
ATACTTTGGTTTAGCTTCGGGGCATCATGTTTCTTATTTCTTGCCATTGCAATGGGTCTTGTTT
TCATATGTATAAAAAATGGAACATGCGGTGCACTATTTGTATATAAGAGCTCTAAGTTAAAAT
GCTTCTTCGTCCTCTATTTATAATATGTTTGTATTGTTAATTTGTTCTGTAGAAGAGCTTA
ATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAAGTGGTGAATGTAATTCATTAC
ATAAGTGGAGTCAGAATCAGAATGTTTCTCCATACTAAGTGAAGTGAAGTGAAGTGAAGTGAAGT
ACAATTGTCTTATATTTGAACAATAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTAA
TATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAATTCAT
TAACAATCAACTTAACGTTATTAAGTACTAATTTTATATCATCCCCTTTGATAAATGATAGTACA

Fig. 63

SEQ ID NO: 72

HA from B/Malaysia/2506/2004

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAAG
TTAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTA
AACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGT
TGCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAA
AGGAAGAGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAGTTGTACAAAAGTTGTACC
AAAATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTG
TAAATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAA
AAGAAAGAATAAATTATTTTTAAAATTAAAAGTTGAGTCATTTGATTAAACATGTGATTATTTAAT
GAATTGATGAAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTG
ACATTTGATCTTTTCTATATATTGCCCCATAGAGTCAGTTAACTCATTTTTATATTTTCATAGATC
AAATAAGAGAAATAACGGTATATTAATCCCTCCAAAAAAAAAACGGTATATTTACTAAAAAAT
CTAAGCCACGTAGGAGGATAACAGGATCCCGTAGGAGGATAACATCCAATCCAACCAATCAC
AACATCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCACATCTACATTATCTAAA
TCACACATTCTTCCACACATCTGAGCCACACAAAAACCAATCCACATCTTTATCACCATTCTAT
AAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACT
AATTAATTAATTAATCATCTTGAGAGAAAATGAAGGCAATAATTGTACTACTCATGGTAGTAACA
TCCAATGCAGATCGAATCTGCACTGGGATAACATCGTCAAACCTCACCACATGTTGTCAAACTG
CTACTCAAGGGGAGGTCAATGTGACTGGTGTAAATCCACTGACAACAACACCCACCAATCTC
ATTTTGCAAATCTCAAAGGAACAGAAACCAGAGGGGAAACTATGCCCAAAATGCCTCAACTGCA
CAGATCTGGACGTGGCCTTGGGCAGACCAAAATGCACGGGGAACATACCCCTCGGCAAGAGTT
TCAATACTCCATGAAGTCAGACCTGTTACATCTGGGTGCTTTCTATAATGCACGACAGAACA
AAATTAGACAGCTGCCTAACTTCTCAGAGGATACGAACATATCAGGTTATCAACTCATAACGT
TATCAATGCAGAAAATGCACCAGGAGGACCCTACAAAATTGGAACCTCAGGGTCTTGCCCTAA
CGTTACCAATGGAAACGGATTTTTCGCAACAATGGCTTGGGCCGTCCCAAAAACGACAACAA
CAAAACAGCAACAAATTCATTAACAATAGAAGTACCATACATTTGTACAGAAGGAGAAGACCAA
ATTACCGTTTTGGGGTTTCCACTCTGATAACGAAACCCAAATGGCAAAGCTCTATGGGGACTCA
AAGCCCCAGAAGTTCACCTCATCTGCCAACGGAGTGACCACACATTACGTTTCACAGATTGGT
GGCTTCCCAATCAAACAGAAGACGGAGGACTACCACAAAGCGGTAGAATTGTTGTTGATTAC
ATGGTGCAAAAATCTGGGAAAACAGGAACAATTACCTATCAAAGAGGTATTTTATTGCCTCAA
AAGTGTGGTGCGCAAGTGGCAGGAGCAAGGTAATAAAAGGATCGTTGCCTTAATTGGAGAAG
CAGATTGCCTCCACGAAAAATACGGTGGATTAAACAAAAGCAAGCCTTACTACACAGGGGAAC
ATGCAAAGGCCATAGGAAATTGCCAATATGGGTGAAAACACCCTTGAAGCTGGCCAATGGAA
CCAAATATAGACCTCCTGCAAACTATTAAGGAAAGGGGTTTCTTCGGAGCTATTGCTGGTTT
CTTAGAAGGAGGATGGGAAGGAATGATTGCAGGTTGGCACGGATACACATCCCATGGGGCAC
ATGGAGTAGCGGTGGCAGCAGACCTTAAGAGCACTCAAGAGGCCATAAACAAGATAACAAAAA
ATCTCAACTCTTTGAGTGAGCTGGAAGTAAAGAACTTCAAAGACTAAGCGGTGCCATGGATG
AACTCCACAACGAAATACTAGAAGTAGACGAGAAAGTGGATGATCTCAGAGCTGATACAATAA
GCTCACAATAGAAGTGCAGTCCTGCTTCCAATGAAGGAATAATAACAGTGAAGATGAGC
ATCTCTTGGCGCTTGAAAGAAAGCTGAAGAAAATGCTGGGCCCTCTGCTGTAGAGATAGGGA
ATGGATGCTTTGAAACCAACACAAGTGCAACCAGACCTGTCTCGACAGAATAGCTGCTGGTA
CCTTTGATGCAGGAGAATTTTCTCTCCCCACTTTTGATTCACTGAATATTACTGCTGCATCTTTA
AATGACGATGGATTGGATAATCATACTATACTGCTTTACTACTCAACTGCTGCCTCCAGTTTGG
CTGTAACATTGATAGCTATCTTTGTTGTTTATATGGTCTCCAGAGACAATGTTTCTTGCTCC
ATCTGTCTATAAGAGCTCTAAGTTAAAATGCTTCTTCGTCCTCTATTATAATATGTTTGTATT
GTTAATTTTGTCTTGTAGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTGTATGAGA
TGAAGTGGTGAATGAATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCCCTCCATAACT
AACTAGACATGAAGACCTGCCGCGTACAATTGTCTTATATTTGAACAATAAAATTGAACATCTT
TTGCCACAACCTTTATAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAAT
GGAAATATCAGTTATCGAAATTCATTAACAATCAACTTAACGTTATTAATACTAATTTTATATCA
TCCCCTTTGATAAATGATAGTACA

Fig. 64

SEQ ID NO: 73

HA from B/Florida/4/2006

AGAGGTACCCCGGGCTGGTATATTTATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAAAGT
TAGCAAGTGTGTACATTTTTACTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAA
ACATTAGAGTAAAGAAATATGGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGT
GCAACATTTGAGAAAATTTTGTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAA
GGAAGAGGGGAGAATAAAAAACATAATGTGAGTATGAGAGAGAAAGTTGTACAAAAGTTGTACCAA
AATAGTTGTACAAATATCATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTA
AATAAATAAGGATGACGCATTAGAGAGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAAAAG
AAAGAATAAATTATTTTTAAAATTAAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAAT
TGATGAAAGAGTTGGATTAAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATT
TGATCTTTTCTATATATTGCCCCATAGAGTCAGTTAACTCATTTTTATATTTCATAGATCAAATA
AGAGAAATAACGGTATATTAATCCCTCCAAAAACCAACGGTATATTTACTAAAAATCTAAG
CCACGTAGGAGGATAACAGGATCCCGTAGGAGGATAACATCCAATCCAACCAATCACAAACA
TCCTGATGAGATAACCCACTTTAAGCCACGCATCTGTGGCACATCTACATTATCTAAATCACA
CATTCTTCCACATCTGAGCCACAAAAACCAATCCACATCTTTATCACCCATTCTATAAAAA
ATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAA
TTAATTAATCATCTTGAGAGAAAATGAAGGCAATAATTGTACTACTCATGGTAGTAACATCCAAT
GCAGATCGAATCTGCACTGGAATAACATCTTCAAACCTCACCTCATGTGGTCAAAACAGCCACTC
AAGGGGAGGTCAATGTGACTGGTGTGATACCACTAACAACAACACCAACAAAATCTTATTTTGC
AAATCTCAAAGGAACAAGGACCAGAGGGAACTATGCCAGACTGTCTCAACTGCACAGATCT
GGATGTGGCTTTGGGCAGACCAATGTGTGTGGGGACCACACCTTCGGCGAAGGCTTCAATAC
TCCACGAAGTCAAACCTGTTACATCCGGGTGCTTTCTATAATGCACGACAGAACAAAAATCAG
GCAACTACCCAATCTTCTCAGAGGATATGAAAATATCAGGCTATCAACCCAAAACGTATCGAT
GCGGAAAAGGCACCAGGAGGACCCTACAGACTTGGAACCTCAGGATCTTGCCCTAACGCTAC
CAGTAAGAGCGGATTTTTCGCAACAATGGCTTGGGCTGTCCCAAAGGACAACAACAAAAATGC
AACGAACCCACTAACAGTAGAAGTACCATACATTTGTACAGAAGGGGAAGACCAAATCACTGTT
TGGGGGTTCCATTAGATAACAAAACCCAAATGAAGAACCTCTATGGAGACTCAAATCCTCAA
AGTTCACCTCATCTGCTAATGGAGTAACCACACACTATGTTTCTCAGATTGGCAGCTTCCAGA
TCAAACAGAAGACGGAGGACTACCACAAAGCGGCAGGATTGTTGTTGATTACATGATGCAAAA
ACCTGGGAAAACAGGAACAATTGTCTACCAAAGAGGTGTTTTGTTGCCTCAAAGGTGTGGTG
CGCGAGTGGCAGGAGCAAAGTAATAAAAGGGTCCTTGCCTTTAATTGGTGAAGCAGATTGCCT
TCATGAAAAATACGGTGGATTAAACAAAAGCAAGCCTTACTACACAGGAGAACATGCAAAAGCC
ATAGGAAATTGCCAATATGGGTGAAAACACCTTTGAAGCTCGCCAATGGAACCAATATAGAC
CTCCTGCAAACTATTAAGGAAAGGGGTTTCTTGGAGCTATTGCTGGTTTCTAGAAAGGAG
GATGGGAAGGAATGATTGCAGGCTGGCACGGATACACATCTCACGGAGCACATGGAGTGGCA
GTGGCGGCGGACCTTAAGAGTACGCAAGAAGCTATAACAAGATAACAAAAATCTCAATTCTT
TGAGTGAGCTAGAAGTAAAGAATCTTCAAAGACTAAGTGGTGCCATGGATGAATCCACAACG
AAATACTCGAGCTGGATGAGAAAGTGGATGATCTCAGAGCTGACACTATAAGCTCGAAATAG
AAGTGCAGTCTTGCTTTCCAACGAAGGAATAATAACAGTGAAGATGAGCATCTATTGGCACT
TGAGAGAAAACCTAAAGAAAATGCTGGGTCCCTCTGCTGTAGAGATAGGAAATGGATGCTTCGA
AACCAAAACACAAGTGCAACCAGACCTGCTTAGACAGGATAGCTGCTGGCACCTTTAATGCAGG
AGAATTTTCTCTCCCCACTTTTGATTCACTGAACATTACTGCTGCATCTTTAATGATGATGGAT
TGGATAACCATACTATACTGCTCTATTACTCAACTGCTGCTTCTAGTTTGGCTGTAAACATTGATG
CTAGCTATTTTATTGTTTATATGGTCTCCAGAGACAACGTTTCATGCTCCATCTGTCTATAAGA
GCTCTAAGTTAAATGCTTCTTCTGCTCCTATTTATAATATGGTTTGTATTGTTAATTTTGTCT
TGTAAGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTGTATGAGATGAAGTGGTGTA
TGTAATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCTCCATAACTAACTAGACATGAA
GACCTGCCGCGTACAATTGTCTTATATTTGAACAATAAAATTGAACATCTTTTCCACAACCTTT
ATAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAATATCAGTTA
TCGAAATTCATTAACAATCAACTTAACGTTATTAACCTACTAATTTTATATCATCCCTTTGATAAA
TGATAGTACA

Fig. 65

Consensus of SEQ ID NO: 49, 48, 33 and 9

SEQ ID NO: 74

MK(X₁)KLLVLLCTFTATYADTICIGYHANNSTDVDTVLEKNVTVTHSVNL
E(X₂)SHNGKLCCLKGIAPLQLGNCSVAGWILGNPECELLIS(X₃)ESWSYIVE(X₄)P
NPENGTCYPG(X₅)FADYEELREQLSSVSSFERFEIFPKESSWPNT(X₆)TGVSA
SCSHNG(X₇)SSFY(X₈)NLLWLTGKNGLYPNLSKSY(X₉)NNKEKEVLVLWGVHPPN
IG(X₁₀)Q (X₁₁)ALYH(X₁₂)ENAYVSVVSSHYSR(X₁₃)FTPEIAKRPKVRDQEGRINYWTLL
EPGDTIIFEANGNLIAP(X₁₄)YAFALSRGFGSGII(X₁₅)SNAPMD(X₁₆)CDAKCQTPQG
AINSSLPFQNVHPVTIGECPKYVRSACLRLMVTGLRNIPSIQSRGLFGAIA
GFIEGGWTGMVDGWYGYHHQNEQGSYAADQKSTQNAINGITNKVNSVIE
KMNTQFTAVGKEFNKLERRMENLNKKVDDGF(X₁₇)DIWTYNAELLVLENERT
LDFHDSNVKNLYEKVKSQKNNAKEIGNGCFFYHKCN(X₁₈)ECMESVKNNGTY
DYPKYSEESKLNREKIDGVKLESMGVYQILAIYSTVASSLVLLVSLGAIS
FWMCSNGSLQCRICI

Fig. 66

SEQ ID NO: 75

MKAKLLVLLCTFTATYADTICIGYHANNSTDVDTVLEKNVTVTHSVNLLLED SHNGKLCLLKGIA
PLQLG
NCSVAGWILGNPECELLISKESWSYIVETPNPENGTCYPGYFADYEELREQLSSVSSFERFEIF
PKESSW
PNHTVTGVSASCSHNGKSSFYRNLLWLTGKNGLYPNLSKSYVNNKEKEVLVLWGVVHPPNI
GNQRALYHT
ENAYVSVVSSHYSRRFTPEIAKRPKVRDQEGRINYYWTLLEPGDTIIFEANGNLIAPWYAFALS
RGFGSG
IITSNAPMDECDACQTPQGAINSSLPFQNVHPVTIGECPKYVRS AKLRMVTGLRNIPSIQSRG
LFGAIA
GFIEGGWTGMVDGWYGYHHQNEQGS GYAADQKSTQNAINGITNKVNSVIEKMNTQFTAVGK
EFNKLERRM
ENLNKKVDDGFLDIWTYNAELLV LLENERTLDFHDSNVKNLYEKVKS QLKNNAKEIGNGCFEF
YHKCNNE
CMESVKNGTYDYPKYSEESKLNREKIDGVKLESMGVYQILAIYSTVASSLVLLVSLGAISFWMC
SNGSLQ
CRICI

Fig. 67

SEQ ID NO: 76

MSLLTEVETYVLSIIPSGPLKAEIAQRLEDVFAGKNTDLEVLMEWLKTRPILSPLTKGILGFVFTLTVPS
ERGLQRRRFVQNALNGNGDPNNMDKAVKLYRKLKREITFHGAKEISLSYSAGALASCMGLIYNRMGAV
TT
EVAFGLVCATCEQIADSQHRSHRQMVTTTNPLIRHENRMVLASTTAKAMEQMAGSSEQAAEAMEVAS
QAR
QMVQAMRTIGTHPSSSAGLKNDLLENLQAYQKRMGVQMQRFK

Figure 68

TTAATTAAGAATTCGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATCTGTC
ACTTTATTGAGAAGATAGTGGAAAAGGAAGGTGGCTCCTACAAATGCCATCATTGCCGATAAAG
GAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCCCCACCCACG
AGGAGCATCGTGGAAAAAGAAGACGTTCCAACCACGTCTTCAAAGCAAGTGGATTGATGTGAT
ATCTCCACTGACGTAAGGGATGACGCACAATCCCCTATCCTTCGCAAGACCCTTCCTCTATA
TAAGGAAGTTCATTTCAATTTGGAGAGGTATTAATACTTAATAGGTTTTGATAAAAGCGAACGT
GGGGAAACCCGAACCAAACCTTCTTCTAACTCTCTCTCATCTCTCTTAAAGCAAACCTTCTCTC
TTGTCTTTCTTGCGTGAGCGATCTTCAACGTTGTGAGATCGTGCTTCGGCACCAGTACAACGT
TTTCTTTCCTGAAGCGAAATCAAAGATCTCTTTGTGGACACGTAGTGCGGCGCCATTAAATAA
CGTGTACTTGTCTATTCTTGTGCGGTGTGGTCTTGGGAAAAGAAAGCTTGCTGGAGGCTGCTG
TTCAGCCCCATACATTACTTGTACGATTCTGCTGACTTTCGGCGGGTGCAATATCTCTACTTC
TGCTTGACGAGGTATTGTTGCCTGTACTTCTTCTTCTTCTTCTTCTGCTGATTGGTTCTATAAGAA
ATCTAGTATTTTCTTTGAAACAGAGTTTTCCCGTGGTTTTCGAACTTGGAGAAAGATTGTTAAGC
TTCTGTATATTCTGCCCAAATTTGTGCGGCCCATGGTTTTCACACCTCAGATACCTGGACTTAT
GCTTTTTTGGATTTGAGCCTCCAGAGGTGATATTGTGCTAACTCAGTCTCCAGCCACCCTGTCT
GTGACTCCAGGAGATAGTGTGAGTCTTTCTGAGGGCCAGCCAAAGTATTAGCAACAACCTA
CACTGGTTTTCAACAAAAATCGCATGAGTCTCCAAGGCTTCTCATCAAGTATGCTTCCCAGTCCA
TATCTGGGATCCCCTCCAGGTTGAGTGGCAGTGGATCTGGGACAGATTTCACTCTCAGTATCA
ACAGTGTGAAGACTGAAGATTTTGAATGTTTTCTGTCAACAGAGTAACAGCTGGCCTCTCAC
GTTGCGGTGATGGGACAAAGCTGGAGCTGAAACGGGCTGATGCTGCACCAACTGTATCCATCT
TCCCACCATCCAGTGAGCAGTTAACATCTGGAGGTGCCTCAGTCGTGTGCTTCTTGAACAACT
TCTACCCCAAAGACATCAATGTCAAGTGAAGATTGATGGCAGTGAACGACAAAATGGCGTCC
TGAACAGTTGGACTGATCAGGACAGCAAAGACAGCACCTACAGCATGAGCAGCACCCCTCACG
TTGACCAAGGACGAGTATGAACGACATAACAGCTATACCTGTGAGGCCACTCACAAGACATCA
ACTTCACCCATTGTCAAGAGCTTCAACAGGAATGAGTGTAGAGGCCTATTTTCTTTAGTTTGA
ATTTACTGTTATTCGGTGTGCATTTCTATGTTTGGTGAGCGGTTTTCTGTGCTCAGAGTGTGTT
TATTTTATGTAATTTAATTTCTTTGTGAGCTCCTGTTTAGCAGGTCGTCCCTTCAGCAAGGACAC
AAAAAGATTTTAATTTTATTAATAAAAAAAAAAAAAAAAAAGACCGGGAATTCGATATCAAGCTTATC
GACCTGCAGATCGTTCAAACATTTGGCAATAAAGTTTCTTAAGATTGAATCCTGTTGCCGGTCT
TGCGATGATTATCATATAATTTCTGTTGAATTACGTTAAGCATGTAATAATTAACATGTAATGCA
TGACGTTATTTATGAGATGGGTTTTATGATTAGAGTCCCGCAATTATACATTTAATACGCGATA
GAAAACAAAATATAGCGCGCAAACCTAGGATAAATTATCGCGCGCGGTGTCATCTATGTTACTA
GATTCTAGAGTCTCAAGCTTCGGCGCGCC

Figure 69

AAGCTTGCTAGCGGCCTCAATGGCCCTGCAGGTCGACTCTAGAGGTACCCCGGGCTGGTAT
 ATTTATATGTTGTCAAATAACTCAAAAACCATATAAAGTTTAAGTTAGCAAGTGTGTACATTTTAA
 CTTGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAACATTAGAGTAAAGAAATAT
 GGATGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTTGCAACATTTGAGAAAATTT
 TGTTGTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAAGAGGGGAGAATAAA
 AACATAATGTGAGTATGAGAGAGAAAAGTTGTACAAAAGTTGTACCAAAATAGTTGTACAAATAT
 CATTGAGGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAATAAGGATGAC
 GCATTAGAGAGATGTACCATTAGAGAATTTTGGCAAGTCATTAAAAAGAAAGAATAAATTATT
 TTTAAAATTAAAAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAATTGATGAAAGAGTT
 GGATTAAGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTTCT
 ATATATTGCCCCATAGAGTCAGTTAACTCATTTTATATTTTCATAGATCAAATAAGAGAAAATAAC
 GGTATATTAATCCCTCCAAAAAAGAAACGGTATATTTACTAAAAAATCTAAGCCACGTAGGA
 GGATAACAGGATCCCGTAGGAGGATAACATCCAATCCAACCAATCACAACAATCCTGATGA
 GATAACCCACTTTAAGCCACGCATCTGTGGCACATCTACATTATCTAAATCACACATTCTTCC
 ACACATCTGAGCCACACAAAAACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACT
 TTGTGAGTCTACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTA
 ATCATCTTGAGAGAAAAATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTCTTCTGTG
 TTGGTTCCTTCTCAGATCTTCGCTGATCAGATTTGCATTGGTTACCATGCAAACAATCAACAG
 AGCAGGTTGACACAATCATGGAAAAGAAGCTTACTGTTACACATGCCCAAGACATACTGGAAA
 AGACACACAACGGGAAGCTCTGCGATCTAGATGGAGTGAAGCCTCTAATTTTAAAGAGATTGTA
 GTGTAGCTGGATGGCTCCTCGGGAACCCAATGTGTGACGAATTCATCAATGTACCGGAATGG
 TCTTACATAGTGGAGAAGGCCAATCCAACCAATGACCTCTGTTACCCAGGGAGTTTCAACGAC
 TATGAAGAAGTGAACACCTATTGAGCAGAATAAACCATTTTGAGAAAATCAAATCATCCCCA
 AAAGTTCTTGGTCCGATCATGAAGCCTCATCAGGAGTTAGCTCAGCATGTCCATACCTGGGAA
 GTCCTCTCTTTTTAGAAATGTGGTATGGCTTATCAAAAAGAACAGTACATACCCAACAATAAA
 GAAAAGCTACAATAATACCAACCAAGAGGATCTTTTGGTACTGTGGGGAATTCACCATCCTAA
 TGATGCGGCAGAGCAGACAAGGCTATATCAAAACCCAACCACTATATTTCCATTGGGACATC
 AACACTAAACCAGAGATTGGTACCAAAATAGCTACTAGATCCAAAGTAAACGGGGCAAAGTGG
 AAGGATGGAGTTCTTCTGGACAATTTTAAACCTAATGATGCAATCAACTTCGAGAGTAATGG
 AAATTTTCATTGCTCCAGAATATGCATACAAAATTTGTCAAGAAAGGGGACTCAGCAATTATGAAA
 AGTGAATTGGAATATGGTAACTGCAACACCAAGTGTCAAACCTCAATGGGGGCGATAAACTCT
 AGTATGCCATTCCACAACATACACCCTCTCACCATCGGGGAATGCCCAATATGTGAAATCA
 AACAGATTAGTCCTTGCAACAGGGCTCAGAAATAGCCCTCAAAGAGAGAGCAGAAGAAAAAA
 GAGAGGACTATTTGGAGCTATAGCAGGTTTTATAGAGGGAGGATGGCAGGGAATGGTAGATG
 GTTGGTATGGGTACCACCATAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATC
 CACTCAAAAGGCAATAGATGGAGTCACCAATAAGGTCAACTCAATCATTGACAAAATGAACAC
 TCAGTTTGAGGGCCGTTGGAAGGGAATTTAATACTTAGAAAGGAGAATAGAGAATTTAAACAA
 GAAGATGGAAGACGGGTTTCTAGATGTCTGGACTTATAATGCCGAACCTCTGGTTCTCATGGA
 AAATGAGAGAAGCTCTAGACTTTTCATGACTCAAATGTTAAGAACCTCTACGACAAGGTCCGACT
 ACAGCTTAGGGATAATGCAAAGGAGCTGGGTAACGGTTGTTTCGAGTTCTATCACAAATGTGA
 TAATGAATGTATGGAAAGTATAAGAAACGGAACGTACAACCTATCCGCAGTATTCAGAAGAAGC
 AAGATTAAGAGAGAGGAAATAAGTGGGGTAAAATTGGAATCAATAGGAAGTACCAATACT
 GTCAATTTATTCAACAGTGGCGAGTTCCCTAGCACTGGCAATCATGATGGCTGGTCTATCTTT
 ATGGATGTGCTCCAATGGATCGTTACAATGCAGAATTTGCATTTAAGAGCTCTAAGTTAAAATG
 CTTCTTCGCTCCTATTTATAATATGGTTTGTTATTGTTAATTTTGTCTTGTAGAAGAGCTTAA
 TTAATCGTTGTTGTTATGAAATACTATTGTATGAGATGAAGTGGTGAATTCATTTACATA
 TAAGTGAGAGTCAGAATCAGAATGTTTCCCTCCATAACTAAGTACATGAAGACATGCCGCGTA
 CAATTGTCTTATATTTGAACAACATAAATTGAACATCTTTTGCCACAACCTTTATAAGTGGTTAAT
 ATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCGAAATTCATT
 AACAACTCAACTTAACGTTATTAATACTACTAATTTTATATCATCCCTTTGATAAATGATAGTACAC
 CAATTAGGAAGGAGCATGCTCGAGGCCTGGCTGGCCGAATTC

Figure 70

AAGCTTGCTAGCGGCCTCAATGGCCCTGCAGGTCGACTCTAGAGGTACCCCGGGCTGGTATA
TTTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAAGTTAGCAAGTGTGTACATTTTTACT
TGAACAAAAATATTCACCTACTACTGTTATAAATCATTATTAACATTAGAGTAAAGAAATATGGA
TGATAAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTTGCAACATTTGAGAAAAATTTGTT
GTTCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAAGAGGGGAGAATAAAAAACAT
AATGTGAGTATGAGAGAGAAAGTTGTACAAAAGTTGTACCAAAATAGTTGTACAAATATCATTGA
GGAATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAATAAGGATGACGCATTA
GAGAGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAAAAGAAAGAATAAATTATTTTTAAAA
TTAAAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAATTGATGAAAGAGTTGGATTAA
AGTTGTATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTTCTATATATTG
CCCCATAGAGTCAGTTAACTCATTTTTATATTTCATAGATCAAATAAGAGAAATAACGGTATATT
AATCCCTCCAAAAAACGGTATATTTACTAAAAAATCTAAGCCACGTAGGAGGATAACA
GGATCCCCGTAGGAGGATAACATCCAATCCAACCAATCACAACAATCCTGATGAGATAACCCA
CTTTAAGCCACGCATCTGTGGCACATCTACATTATCTAAATCACACATTCTTCCACACATCTG
AGCCACACAAAAACCAATCCACATCTTTATCACCATTCTATAAAAAATCACACTTTGTGAGTCT
ACACTTTGATTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAG
AGAAAATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTTCTTGTGTTGGTTCCTTCT
CAGATCTTCGCTGACACAATATGTATAGGCTACCATGCTAACAACTCGACCGACACTGTTGACA
CAGTACTTGAAAAAGTGTGACAGTGACACACTCTGTCAACCTGCTTGAGAACAGTCACAATG
GAAAATATGTCTATTAAGGAATAGCCCCACTACAATTGGGTAATTGCAGCGTTGCCGGGT
GGATCTTAGGAAACCCAGAATGCGAATTACTGATTTCCAAGGAGTCATGGTCTACATTGTAGA
AAAACCAATCCTGAGAATGGAACATGTTACCCAGGGCATTTCGCTGACTATGAGGAACTGAG
GGAGCAATTGAGTTCAGTATCTTCATTTGAGAGGTTCGAAATATCCCAAAGAAAGCTCATGG
CCCAACCACACCGTAACCGGAGTGTGAGCATCATGCTCCCATAAATGGGGAAAGCAGTTTTTAC
AGAAATTTGCTATGGCTGACGGGGAAGAATGGTTGTACCCAAACCTGAGCAAGTCCTATGCA
AACAACAAAGAAAAAGAAGTCCTTGACTATGGGGTGTTCATCACCCGCCAAACATAGGTGAC
CAAAAGGCCCTCTATCATACAGAAAATGCTTATGTCTCTGTAGTGTCTTCACATTATAGCAGAA
AATTCACCCAGAAATAGCCAAAAGACCCAAAGTAAGAGATCAAGAAGGAAGAATCAATTACTA
CTGGACTCTGCTTGAACCCGGGGATACAATAATATTTGAGGCAAATGGAAATCTAATAGCGCC
AAGATATGCTTTCGCACTGAGTAGAGGCTTTGGATCAGGAATCATCAACTCAAATGCACCAATG
GATAAATGTGATGCGAAGTGCCAAACACCTCAGGGAGCTATAAACAGCAGTCTTCTTTCCAG
AACGTACACCCAGTCACAATAGGAGAGTGTCCAAAGTATGTCAGGAGTGCAAAATTAAGGATG
GTTACAGGACTAAGGAACATCCCATCCATTCAATCCAGAGGTTTGTGGAGCCATTGCCGGT
TTCAATTGAAGGGGGGTGGACTGGAATGGTAGATGGTTGGTATGGTTATCATCATCAGAATGAG
CAAGGATCTGGCTATGCTGCAGATCAAAAAAGCACACAAAATGCCATTAATGGGATTACAAACA
AGGTCAATTCTGTAATTGAGAAAATGAACACTCAATTCACAGCAGTGGGCAAAGAGTTCAACAA
ATTGGAAGAAGGATGGAACCTTGAATAAAAAAGTTGATGATGGGTTTATAGACATTTGGACA
TATAATGCAGAACTGTTGGTTCTACTGGAAAATGAAAGGACTTTGGATTTCCATGACTCCAATG
TGAAGAATCTGTATGAGAAAGTAAAAAGCCAGTTAAAGAATAATGCTAAAGAAATAGGAAATGG
GTGTTTTGAGTTCTATCACAAGTGTAACGATGAATGCATGGAGAGTGTAAGAATGGAACCTAT
GACTATCCAAAATATTCCGAAGAATCAAAGTTAAACAGGGAGAAAATTGATGGAGTGAAATTGG
AATCAATGGGAGTCTATCAGATTCTGGCGATCTACTCAACAGTCGCCAGTTCTCTGGTTCTTTT
GGTCTCCCTGGGGGCAATCAGCTTCTGGATGTGTTCCAATGGGTCTTTACAGTGTAGAATATG
CATCTAAGAGCTCTAAGTTAAAATGCTTCTTCGTCTCCTATTTATAATATGGTTTGTATTGTTAA
TTTTGTTCTGTAGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAAC
TGGTGTAAATGTAATTCATTACATAAGTGGAGTCAGAATCAGAATGTTTCTCCATAACTAATA
GACATGAAGACCTGCCGCGTACAATTGTCTTATATTTGAACAACTAAAATTGAACATCTTTTGC
CACAACTTTATAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAA
ATATCAGTTATCGAAATTCATTAACAATCAACTTAACGTTATTAATACTAATTTTATATCATCCC
CTTTGATAAATGATAGTACACCAATTAGGAAGGAGCATGCTCGAGGCCTGGCTGGCCGAATTC

Figure 71

AAGCTTGCTAGCGGCCTCAATGGCCCTGCAGGTCGACTCTAGAGGTACCCCGGGCTGGTATAT
 TTATATGTTGTCAAATAACTCAAAAACCATAAAAGTTTAAGTTAGCAAGTGTGTACATTTTTACTT
 GAACAAAATATTACCTACTACTGTTATAAATCATTATTAACATTAGAGTAAAGAAAATATGGAT
 GATAAGAACAAGAGTAGTGATATTTTGACAACAATTTGTTGCAACATTTGAGAAAATTTGTTGT
 TCTCTCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAAGAGGGAGAAATAAAAACATAAT
 GTGAGTATGAGAGAGAAAGTTGTACAAAAGTTGTACCAAAATAGTTGTACAAATATCATTGAGG
 AATTTGACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAATAAGGATGACGCATTAGAG
 AGATGTACCATTAGAGAATTTTTGGCAAGTCATTAAGAAAGAAATAAATTATTTTTAAATTA
 AAGTTGAGTCATTTGATTAAACATGTGATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTG
 TATTAGTAATTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTTCTATATATTGCCCAT
 AGAGTCAGTTAACTCATTTTTATATTTATAGATCAAATAAGAGAAATAACGGTATATTAATCCCT
 CCAAAAAAAAAAAAAACGGTATATTTACTAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCC
 CGTAGGAGGATAACATCCAATCCAACCAATCACAACATCCTGATGAGATAACCCACTTTAAGC
 CCACGCATCTGTGGCACATCTACATTATCTAAATCACACATTCTTCCACACATCTGAGCCACAC
 AAAAACCAATCCACATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGA
 TTCCCTTCAAACACATACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGG
CGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTTCTTGTGTTGGTTCCTTCTCAGATCTTC
GCTCAAAAACCTCCCGGAAATGACAACAGCACGGCAACGCTGTGCCTTGGGCACCATGCAGTA
CCAAACGGAACGATAGTGAAAACAATCACGAATGACCAAATTGAAGTTACTAATGCTACTGAGC
TGGTTGAGAGTTCTCAACAGGTGAAATATGCGACAGTCCTCATCAGATCCTTGATGGAGAAAA
CTGCACACTAATAGATGCTCTATTGGGAGACCCTCAGTGTGATGGCTTCCAAAATAAGAAATGG
GACCTTTTTGTTGAACGCAGCAAAGCCTACAGCAACTGTTACCCTTATGATGTGCCGGATTATG
CCTCCCTTAGGTCACTAGTTGCCTCATCCGGCACACTGGAGTTTAACAATGAAAGTTTCAATTG
GACTGGAGTCACTCAAAACGGAACAAGCTCTGCTTGCATAAGGAGATCTAATAACAGTTTCTTT
AGTAGATTGAATTGGTTGACCCACTTAAATTCAAATACCCAGCATTGAACGTGACTATGCCAAA
CAATGAAAAATTTGACAAATTGTACATTTGGGGGGTTCAACCACCCGGGTACGGACAATGACCAA
ATCTTCCTGTATGCTCAAGCATCAGGAAGAATCACAGTCTCTACCAAAAAGAGCCAACAACTG
TAATCCCGAATATCGGATCTAGACCCAGAGTAAGGAATATCCCGAGCAGAATAAGCATCTATTG
GACAATAGTAAAACCGGGAGACATACTTTTGATTAAACAGCACAGGGAATCTAATTGCTCCTAGG
GGTTACTTCAAATACGAAGTGGGAAAAGCTCAATAATGAGATCAGATGCACCCATTGGCAAAT
GCAATTCTGAATGCATCACTCCAAACGGAAGCATTCCCAATGACAAACCATTCCAAAATGTAAA
CAGGATCACATACGGGGCCTGTCCCAGATATGTTAAGCAAAACACTCTGAAATTGGCAACAGG
GATGCGAAATGTACCAGAGAAACAACTAGAGGCATATTTGGCGCAATCGCGGGTTTCATAGA
AAATGGTTGGGAGGGAATGGTGGATGGTTGGTATGGTTTCAGGCATCAAAATTCTGAGGGAAT
AGGACAAGCAGCAGATCTCAAAGCACTCAAGCAGCAATCGATCAAATCAATGGGAAGCTGAA
TAGGTTGATCGGGAAAACCAACGAGAAATCCATCAGATTGAAAAAGAGTTCTCAGAAGTCGAA
GGGAGAATCCAGGACCTTGAGAAATATGTTGAGGACACCAAAATAGATCTCTGGTCATACAACG
CGGAGCTTCTTGTTGCCCTGGAGAACCAACATACAATTGATCTAACTGACTCAGAAATGAACAA
ACTGTTTGAAAAACAAAGAAGCAACTGAGGGAAAATGCTGAGGATATGGGCAATGGTTGTTTC
AAAATATACCACAAATGTGACAAATGCCTGCATAGGATCAATCAGAAATGGAACCTTATGACCAG
ATGTATACAGAGATGAAGCATTAAACAACCGGTTCCAGATCAAGGGCGTTGAGCTGAAGTCAG
GATACAAAGATTGGATACTATGGATTTCTTTGCCATATCATGTTTTTGCTTTGTGTTGCTTTGT
TGGGGTTCATCATGTGGGCCTGCCAAAAGGCAACATTAGGTGCAACATTTGCATTTGAGAGC
TCTAAGTTAAAATGCTTCTTCGTCTCCTATTTATAATATGGTTTGTATTGTTAATTTTGTCTTGT
AGAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTGAATGT
AATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCTCCATACTAACTAGACATGAAGAC
CTGCCGCGTACAATTGTCTTATATTTGAACAACATAAATTGAACATCTTTTGCCACAACCTTTATAA
GTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATCG
AAATTCATTAACAATCAACTTAACGTTATTAATACTAATTTTATATCATCCCTTTGATAAATGAT
 AGTACACCAATTAGGAAGGAGCATGCTCGAGGCCTGGCTGGCCGAATTC

Figure 72

AAGCTTGCTAGCGGCCTCAATGGCCCTGCAGGTCGACTCTAGAGGTACCCCGGGCTGGTATATT
TATATGTTGTCAAATAACTCAAAAACCATAAAAAGTTTAAAGTTAGCAAGTGTGTACATTTTACTTGA
ACAAAAATATTACCTACTACTGTTATAAATCATTATTAACATTAGAGTAAAGAAATATGGATGAT
AAGAACAAGAGTAGTGATATTTTGACAACAATTTTGTTGCAACATTTGAGAAAATTTTGTTGTTCTC
TCTTTTCATTGGTCAAAAACAATAGAGAGAGAAAAAGGAAGAGGGAGAATAAAAAACATAATGTGA
GTATGAGAGAGAAAAGTTGTACAAAAGTTGTACCAAAATAGTTGTACAAATATCATTGAGGAATTTG
ACAAAAGCTACACAAATAAGGGTTAATTGCTGTAAATAAATAAGGATGACGCATTAGAGAGATGTA
CCATTAGAGAATTTTGGCAAGTCATTAAAAAGAAAGAATAAATTATTTTAAAATTAAGTTGAG
TCATTTGATTAAACATGTGATTATTTAATGAATTGATGAAAGAGTTGGATTAAAGTTGTATTAGTAA
TTAGAATTTGGTGTCAAATTTAATTTGACATTTGATCTTTTCTATATATTGCCCCATAGAGTCAGT
TAACCTCATTTTATATTTCATAGATCAAATAAGAGAAAATAACGGTATATTAATCCCTCCAAAAAAA
AAAACGGTATATTTACTAAAAATCTAAGCCACGTAGGAGGATAACAGGATCCCGTAGGAGGAT
AACATCCAATCCAACCAATCACACAATCCTGATGAGATAACCCACTTTAAGCCCACGCATCTGT
GGCACATCTACATTATCTAAATCACACATTCTCCACACATCTGAGCCACACAAAAACCAATCCAC
ATCTTTATCACCCATTCTATAAAAAATCACACTTTGTGAGTCTACACTTTGATTCCCTTCAAACACA
TACAAAGAGAAGAGACTAATTAATTAATTAATCATCTTGAGAGAAAATGGCGAAAAACGTTGCGAT
TTTCGGCTTATTGTTTTCTCTTCTGTGTTGGTTCCTTCTCAGATCTTCGCTGATCGAATCTGCACT
GGAATAACATCTTCAAACCTCACCTCATGTGGTCAAAACAGCCACTCAAGGGGAGGTCAATGTGAC
TGGTGTGATACCACTAACAACAACACCAACAAAATCTTATTTGCAAATCTCAAAGGAACAAGGAC
CAGAGGGAACTATGCCAGACTGTCTCAACTGCACAGATCTGGATGTGGCTTTGGGCAGACCA
ATGTGTGTGGGGACCACACCTTCGGCGAAGGCTTCAATACTCCACGAAGTCAAACCTGTTACATC
CGGGTGCTTTCCTATAATGCACGACAGAACAAAAATCAGGCAACTACCCAATCTTCTCAGAGGAT
ATGAAAATATCAGGCTATCAACCCAAAACGTCATCGATGCGGAAAAGGCACCAGGAGGACCCTA
CAGACTTGGAACCTCAGGATCTTGCCCTAACGCTACCAGTAAGAGCGGATTTTTCGCAACAATGG
CTTGGGCTGTCCCAAAGGACAACAACAAAAATGCAACGAACCCACTAACAGTAGAAGTACCATAC
ATTTGTACAGAAGGGGAAGACCAATCACTGTTTGGGGGTTCCATTAGATAACAAAACCCAAAT
GAAGAACCTCTATGGAGACTCAAATCCTCAAAAGTTACCTCATCTGCTAATGGAGTAACCACAC
ACTATGTTTCTCAGATTGGCAGCTTCCAGATCAAACAGAAGACGGAGGACTACCACAAAGCGG
CAGGATTGTTGTTGATTACATGATGCAAAAACCTGGGAAAACAGGAACAATTGTCTACCAAAGG
GTGTTTTGTTGCCTCAAAAGGTGTGGTGCGGAGTGGCAGGAGCAAAAGTAAATAAAAGGGTCCTT
GCCTTTAATTGGTGAAGCAGATTGCCTTCAGGAAAAATACGGTGGATTAAACAAAAGCAAGCCTTA
CTACACAGGAGAACATGCAAAAGCCATAGGAAATTGCCAATATGGGTGAAAACACCTTTGAAGC
TCGCCAATGGAACCAAATATAGACCTCCTGCAAAACTATTAAAGGAAAGGGGTTTCTTCGGAGCT
ATTGCTGGTTTCTAGAAAGGAGGATGGGAAGGAATGATTGCAGGCTGGCACGGATACACATCTC
ACGGAGCACATGGAGTGGCAGTGGCGGCGGACCTTAAGAGTACGCAAGAAGCTATAAACAAGAT
AACAAAAATCTCAATTCTTTGAGTGAGCTAGAAGTAAAGAATCTTCAAAGACTAAGTGGTGCCAT
GGATGAACTCCACAACGAAATACTCGAGCTGGATGAGAAAGTGGATGATCTCAGAGCTGACACT
ATAAGCTCGCAAATAGAACTTGCAGTCTTGCTTTCCAACGAAGGAATAATAACAGTGAAGATGA
GCATCTATTGGCACTTGAGAGAAAACATAAGAAAATGCTGGGTCCCTCTGCTGTAGAGATAGGAA
ATGGATGCTTCGAAACCAACACAAGTGCAACCAGACCTGCTTAGACAGGATAGCTGCTGGCAC
CTTTAATGCAGGAGAATTTTCTCTCCCACTTTTGATTCACTGAACATTACTGCTGCATCTTTAAAT
GATGATGGATTGGATAACCATACTATACTGCTCTATTACTCAACTGCTGCTTCTAGTTTGGCTGTA
ACATTGATGCTAGCTATTTTTATTGTTTATATGGTCTCCAGAGACAACGTTTCATGCTCCATCTGTC
TATAAGAGCTCTAAGTTAAATGCTTCTTCGTCTCCTATTTATAATATGGTTTGTTATTGTTAATTTT
GTTCTTGTAAGAGCTTAATTAATCGTTGTTGTTATGAAATACTATTTGTATGAGATGAACTGGTG
TAATGTAATTCATTTACATAAGTGGAGTCAGAATCAGAATGTTTCCTCCATAACTAAGTACATGA
AGACCTGCCGCGTACAATTGTCTTATTTGAACAACTAAAATTGAACATCTTTTGCCACAACCTTTA
TAAGTGGTTAATATAGCTCAAATATATGGTCAAGTTCAATAGATTAATAATGGAAATATCAGTTATC
GAAATTCATTAACAATCAACTTAACGTTATTAACCTACTAATTTTATATCATCCCTTTGATAAATGAT
AGTACACCAATTAGGAAGGAGCATGCTCGAGGCCTGGCTGGCCGAATTC

Figure 73

TTAATTAAGAATTGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATCT
 GTCACTTTATTGAGAAGATAGTGGAAGGAAGGTGGCTCCTACAAATGCCATCATTGCG
 ATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCC
 CCACCCACGAGGAGCATCGTGGAAAAAGAAGACGTTCCAACCACGTCTTCAAAGCAAGT
 GGATTGATGTGATATCTCCACTGACGTAAGGGATGACGCACAATCCCACTATCCTTCGCA
 AGACCCTTCCTCTATATAAGGAAGTTCATTTTCAATTTGGAGAGGTATTAATCTTAATAGGT
 TTTGATAAAAGCGAACGTGGGGAACCCGAACCAACCTTCTTCTAACTCTCTCTCATCT
 CTCTTAAAGCAAACCTTCTCTTGTCTTTCTTGCCTGAGCGATCTTCAACGTTGTCAGATC
 GTGCTTCGGCACCAGTACAACGTTTTCTTCACTGAAGCGAAATCAAAGATCTCTTTGTGG
 ACACGTAGTGCGGCGCCATTAAATAACGTGTACTTGTCTTCTTGTCTGGTGTGGTCTT
 GGGAAAAGAAAGCTTGCTGGAGGCTGCTGTTGAGCCCCATACATTACTTGTACGATTCT
 GCTGACTTTTCGGCGGGTGCAATATCTCTACTTCTGCTTGACGAGGTATTGTTGCCTGTAC
 TTCTTTCTTCTTCTTCTTGTCTGATTGGTTCTATAAGAAATCTAGTATTTTCTTTGAAACAGA
 GTTTTCCCGTGTTTTGGAACCTTGAGAAAGATTGTTAAGCTTCTGTATATTCTGCCCAA
 TTTGTCTGGGCCCATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTCTTCTTGTGT
 TGGTTCCTTCTCAGATCTTCGCTGACACAATATGTATAGGCTACCATGCCAACAACTCAAC
 CGACACTGTTGACACAGTACTTGAGAAGAATGTGACAGTGACACACTCTGTCAACCTACT
 TGAGGACAGTCACAATGGAAAACCTATGTCTACTAAAAGGAATAGCCCCACTACAATTGGG
 TAATTGCAGCGTTGCCGGATGGATCTTAGGAAACCCAGAATGCGAATTACTGATTTCCAA
 GGAATCATGGTCTACATTGTAGAAACACCAATCCTGAGAATGGAACATGTTACCCAGG
 GTATTTCCCGGACTATGAGGAACTGAGGGAGCAATTGAGTTCAGTATCTTCATTTGAGAG
 ATTCGAAATATTCCCCAAAGAAAGCTCATGGCCCAACACACCGTAACCGGAGTATCAGC
 ATCATGCTCCCATAAATGGGAAAAGCAGTTTTTACAGAAATTTGCTATGGCTGACGGGGAA
 GAATGGTTTGTACCCAAACCTGAGCAAGTCTATGTAACAACAAAGAGAAAGAAGTCCTT
 GTACTATGGGGTGTTTCATCACCCGCCTAACATAGGGAACCAAGGGCACTCTATCATACA
 GAAAATGCTTATGTCTCTGTAGTGTCTTACATTATAGCAGAAGATTACCCCAAGAAATG
 CAAAAGACCCAAAGTAAGAGATCAGGAAGGAAGAATCAACTACTACTGGACTCTGCTGG
 AACCTGGGGATACAATAATATTTGAGGCAAATGGAATCTAATAGCGCCATGGTATGCTTT
 TGCCTGAGTAGAGGCTTTGGATCAGGAATCATCACCTCAAATGCACCAATGGATGAATG
 TGATGCGAAGTGTCAAACACCTCAGGGAGCTATAAACAGCAGTCTTCCTTCCAGAATGT
 ACACCCAGTCACAATAGGAGAGTGTCCAAAGTATGTGAGGAGTGCAAAATTAAGGATGGT
 TACAGGACTAAGGAACATCCCATCCATTCAATCCAGAGGTTTGTGGAGCCATTGCCGG
 TTTTATTGAAGGGGGGTGGACTGGAATGGTAGATGGGTGGTATGGTTATCATCATCAGAA
 TGAGCAAGGATCTGGCTATGCTGCAGATCAAAAAGTACACAAAATGCCATTAACGGGAT
 TACAAACAAGGTCAATTCTGTAATTGAGAAAATGAACACTCAATTCACAGCTGTGGGCAAA
 GAGTTCAACAAATTGGAAGAAGGATGGAAAACCTAAATAAAAAAGTTGATGATGGGTTTC
 TAGACATTTGGACATATAATGCAGAATTGTTGGTTCTACTGGAAAATGAAAGGACTTTGGA
 TTTCCATGACTCCAATGTGAAGAATCTGTATGAGAAAGTAAAAAGCCAATTAAGAATAAT
 GCCAAAGAAATAGGAAACGGGTGTTTTGAGTTCTATCACAAGTGAACAATGAATGCATG
 GAGAGTGTGAAAAATGGTACCTATGACTATCCAAAATATTCCGAAGAATCAAAGTTAAACA
 GGGAGAAAATTGATGGAGTGAAATTGGAATCAATGGGAGTATACCAGATTCTGGCGATCT
 ACTCAACTGTGCGCAGTTCCCTGGTTCTTTTGGTCTCCCTGGGGGCAATCAGCTTCTGGA
 TGTGTTCCAATGGGTCTTTCAGTGTAGAATATGCATCTAAAGGCCTATTTTCTTTAGTTT
 GAATTTACTGTTATTCGGTGTGCATTTCTATGTTTGGTGAGCGGTTTTCTGTGCTCAGAGT
 GTGTTTATTTTATGTAATTTAATTTCTTTGTGAGCTCCTGTTTAGCAGGTCGTCCCTTCAGC
 AAGGACACAAAAAGATTTTAAATTTATTAATAAAAAAAAAAAAAAAAAAGACCGGGAATTCGATA
 TCAAGCTTATCGACCTGCAGATCGTTCAAACATTTGGCAATAAAGTTTCTTAAGATTGAAT
 CCTGTTGCCGGTCTTTCGATGATTATCATATAATTTCTGTTGAATTACGTTAAGCATGTAAT
 AATTAACATGCAATGACGTTATTTATGAGATGGGTTTTATGATTAGAGTCCCGCAAT
 TATACATTTAATACGCGATAGAAAACAAAATATAGCGCGCAAACTAGGATAAATTATCGCG
 CGCGGTGTCATCTATGTTACTAGATTCTAGAGTCTCAAGCTTCGGCGCGCC

Figure 74

TTAATTAAGAATTGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATCT
 GTCACCTTTATTGAGAAGATAGTGGAAAAGGAAGGTGGCTCCTACAAATGCCATCATTGCG
 ATAAAGGAAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCC
 CCACCCACGAGGAGCATCGTGGAAAAAGAAGACGTTCCAACCACGTCTTCAAAGCAAGT
 GGATTGATGTGATATCTCCACTGACGTAAGGGATGACGCACAATCCCACTATCCTTCGCA
 AGACCCCTTCTCTATATAAGGAAGTTCATTTCAATTTGGAGAGGTATTAATCTTAATAGGT
 TTTGATAAAAGCGAACGTGGGGAAACCCGAACCAACCTTCTTCTAACTCTCTCTCATCT
 CTCTTAAAGCAAACCTTCTCTTGTCTTTCTTGCGTGAGCGATCTTCAACGTTGTCAGATC
 GTGCTTCGGCACCAGTACAACGTTTTCTTCACTGAAGCGAAATCAAAGATCTCTTTGTGG
 ACACGTAGTGCGGCGCCATTAAATAACGTGTACTTGTCTATTCTTGTGGTGTGGTCTT
 GGGAAAAGAAAGCTTGCTGGAGGCTGCTGTTACGCCCCATACATTACTTGTACGATTCT
 GCTGACTTTTCGGCGGGTGCAATATCTCTACTTCTGCTTGACGAGGTATTGTTGCCTGTAC
 TTCTTTCTTCTTCTTGTGCTGATTGGTCTATAAGAAATCTAGTATTTTCTTGAACAGA
 GTTTTCCCGTGGTTTTCGAACTTGGAGAAAGATTGTTAAGCTTCTGTATATTCTGCCAAA
 TTTGTGCGGGCCCATGGAGAAAATAGTGCTTCTTCTTGCAATAGTCAGTCTTGTTAAAAGTG
 ATCAGATTGTCATTGGTTACCATGCAAACAATTCAACAGAGCAGGTTGACACAATCATGGA
 AAAGAACGTTACTGTTACACATGCCAAGACATACTGGAAAAGACACACAACGGGAAGCT
 CTGCGATCTAGATGGAGTGAAGCCTCTAATTTTAAGAGATTGTAGTGACGCTGGATGGCT
 CCTCGGGAACCCAATGTGTGACGAATTCATCAATGTACCGGAATGGTCTTACATAGTGA
 GAAGGCCAATCCAACCAATGACCTCTGTTACCCAGGGAGTTTCAACGACTATGAAGAAT
 GAAACACCTATTGAGCAGAATAAACCATTTTGAAGAAATCAAATCATCCCCAAAAGTTCT
 TGGTCCGATCATGAAGCCTCATCAGGAGTTAGCTCAGCATGTCCATACCTGGGAAGTCCC
 TCCTTTTTTAGAAATGTGGTATGGCTTATCAAAAAGAACAGTACATACCCAACAATAAAGA
 AAAGCTACAATAATACCAACCAAGAGGATCTTTGGTACTGTGGGAATTCACCATCCTAA
 TGATGCGGCAGAGCAGACAAGGCTATATCAAAACCCAACCACCTATATTTCCATTGGGAC
 ATCAACACTAAACCAGAGATTGGTACCAAAAATAGCTACTAGATCCAAAGTAAACGGGCAA
 AGTGGAAGGATGGAGTTCTTCTGGACAATTTTAAACCTAATGATGCAATCAACTTCGAGA
 GTAATGGAATTTTCAATTGCTCCAGAATATGCATACAAAATTGTCAAGAAAGGGGACTCAGC
 AATTATGAAAAGTGAATTGGAATATGGTAAGTCAACACCAAGTGTCAAACTCCAATGGGG
 GCGATAAACTCTAGTATGCCATTCCACAACATACACCCTCTCACCATCGGGGAATGCCCC
 AAATATGTGAAATCAAACAGATTAGTCCTTGCAACAGGGCTCAGAAATAGCCCTCAAAGA
 GAGAGCAGAAGAAAAAGAGAGGACTATTTGGAGCTATAGCAGGTTTTATAGAGGGAGGA
 TGGCAGGGGAATGGTAGATGGTTGGTATGGGTACCACCATAGCAATGAGCAGGGGAGTGG
 GTACGCTGCAGACAAAGAATCCAATCAAAAGGCAATAGATGGAGTCACCAATAAGGTCAA
 CTCAATCATTGACAAAATGAACACTCAGTTTGAAGCCGTTGGAAGGGAATTTAATAACTTA
 GAAAGGAGAATAGAGAAATTTAAACAAGAAGATGGAAGACGGGTTTCTAGATGTCTGGACT
 TATAATGCCGAACCTCTGGTTCTCATGGAAAATGAGAGAACTCTAGACTTTCATGACTCAA
 ATGTTAAGAACCTCTACGACAAGGTCCGACTACAGCTTAGGGATAATGCAAAGGAGCTGG
 GTAACGGTTGTTTCGAGTTCTATCACAAATGTGATAATGAATGTATGGAAAGTATAAGAAA
 CGGAACGTACAACCTATCCGCAGTATTCAGAAGAAGCAAGATTAAAAAGAGAGGAAATAAG
 TGGGGTAAAATTGGAATCAATAGGAACCTTACCAATACTGTCAATTTATTCAACAGTGGCG
 AGTTCCCTAGCACTGGCAATCATGATGGCTGGTCTATCTTTATGGATGTGCTCCAATGGA
 TCGTTACAATGCAGAATTTGCATTTAAAGGCCATTTTCTTTAGTTTGAATTTACTGTTATT
 CGGTGTGCATTTCTATGTTTGGTGAGCGGTTTTCTGTGCTCAGAGTGTGTTATTTTATGT
 AATTTAATTTCTTTGTGAGCTCCTGTTTAGCAGGTCGTCCCTTCAGCAAGGACACAAAAAG
 ATTTTAATTTTATTAATAAAAAAAAAAAAAAAAAAGACCGGGAATTCGATATCAAGCTTATCGAC
 CTGCAGATCGTTCAAACATTTGGCAATAAAGTTTCTTAAGATTGAATCCTGTTGCCGGTCT
 TGCGATGATTATCATATAATTTCTGTTGAATTACGTTAAGCATGTAATAATTAACATGTAAT
 GCATGACGTTATTTATGAGATGGGTTTTATGATTAGAGTCCCGCAATTATACATTTAATAC
 GCGATAGAAAACAAAATATAGCGCGCAAACCTAGGATAAATTATCGCGCGCGGTGTCATCT
 ATGTTACTAGATTCTAGAGTCTCAAGCTTCGGCGCGCC

Figure 75

TTAATTAAGAATTGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATCT
 GTCACCTTTATTGAGAAGATAGTGAAAAAGGAAGGTGGCTCCTACAAATGCCATCATTGCG
 ATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCC
 CCACCCACGAGGAGCATCGTGAAAAAGAAGACGTTCCAACCACGTCTTCAAAGCAAGT
 GGATTGATGTGATATCTCCACTGACGTAAGGGATGACGCACAATCCCCTATCCTTCGCA
 AGACCCCTCCTCTATATAAGGAAGTTCATTTCAATTTGGAGAGGTATTAATAGG
 TTTTGATAAAAGCGAACGTGGGGAAACCCGAACCAAACCTTCTTCTAACTCTCTCTCAT
 CTCTCTTAAAGCAAACCTTCTCTTGTCTTTCTTGCGTGAGCGATCTTCAACGTTGTCAGA
 TCGTGCTTCGGCACCAGTACAACGTTTTCTTCTACTGAAGCGAAATCAAAGATCTCTTTGT
 GGACACGTAGTGCGGCGCCATTAAATAACGTGTACTTGTCTATTCTTGTGGTGTGGTC
 TTGGGAAAAGAAAGCTTGCTGGAGGCTGCTGTTACGCCCCATACATTACTTGTACGATT
 CTGCTGACTTTCGGCGGGTGCAATATCTCTACTTCTGCTTGACGAGGTATTGTTGCCTGT
 ACTTCTTTCTTCTTCTTCTTGTGCTGATTGGTCTATAAGAAATCTAGTATTTTCTTGAACA
 GAGTTTTCCCGTGGTTTTCGAACTTGAGAAAAGATTGTTAAGCTTCTGTATATTCTGCCCA
 AATTTGTGGGCCCCATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTTCTTGT
 GTTGGTTCCTTCTCAGATCTTCGCTGATCAGATTGTCATTGTTACCATGCAAACAATTCA
 ACAGAGCAGGTTGACACAATCATGAAAAAGAACGTTACTGTTACACATGCCCAAGACATA
 CTGGAAAAGACACACAACGGGAAGCTCTGCGATCTAGATGGAGTGAAGCCTCTAATTTTA
 AGAGATTGTAGTGTAGCTGGATGGCTCCTCGGAACCCAATGTGTGACGAATTCATCAAT
 GTACCGGAATGGTCTTACATAGTGGAGAAGGCCAATCCAACCAATGACCTCTGTTACCCA
 GGGAGTTTCAACGACTATGAAGAACTGAAACACCTATTGAGCAGAATAAACCATTTTGAG
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 TCAGCATGTCCATACCTGGGAAGTCCCTCCTTTTTAGAAATGTGGTATGGCTTATCAAAA
 AGAACAGTACATACCCAACAATAAAGAAAAGCTACAATAATACCAACCAAGAGGATCTTTT
 GGTACTGTGGGGAATTCACCATCCTAATGATGCGGCAGAGCAGACAAGGCTATATCAAA
 ACCCAACCACCTATATTTCCATTGGGACATCAACACTAAACCAGAGATTGGTACCAAAAAT
 AGCTACTAGATCCAAAGTAAACGGGCAAAGTGGAAGGATGGAGTTCTTCTGGACAATTTT
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 TACACCTCTCACCATCGGGGAATGCCCCAAATATGTGAAATCAAACAGATTAGTCCCTTG
 CAACAGGGCTCAGAAATAGCCCTCAAAGAGAGAGCAGAAGAAAAAGAGAGGACTATTT
 GGAGCTATAGCAGGTTTTATAGAGGGAGGATGGCAGGGAATGGTAGATGGTTGGTATGG
 GTACCACCATAGCAATGAGCAGGGGAGTGGGTACGCTGCAGACAAAGAATCCACTCAAA
 AGGCAATAGATGGAGTCACCAATAAGGTCAACTCAATCATTGACAAAATGAACACTCAGT
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 GACTACAGCTTAGGGATAATGCAAAGGAGCTGGTAACGGTTGTTTCGAGTTCTATCACA
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 AGAAGAAGCAAGATTAAGAGAGAGGAAATAAGTGGGGTAAATTTGAATCAATAGGAAC
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 GCTGGTCTATCTTTATGGATGTGCTCCAATGGATCGTTACAATGCAGAATTTGCATTTAAA
 GGCTATTTTCTTTAGTTTGAATTTACTGTTATTTCGGTGTGCATTTCTATGTTTGGTGAGC
 GGTTTTCTGTGCTCAGAGTGTGTTTATTTTATGTAATTTAATTTCTTTGTGAGCTCCTGTTT
 AGCAGGTCTGTCCTTCAGCAAGGACACAAAAAGATTTTAATTTTATTAATAAAAAAAAAAAAA
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 GAATTACGTAAAGCATGTAATAATTAACATGTAATGCATGACGTTATTTATGAGATGGGTT
 TTTATGATTAGAGTCCCGCAATTATACATTTAATACGCGATAGAAAACAAAATATAGCGCG
 CAACTAGGATAAATTATCGCGCGCGGTGTCATCTATGTTACTAGATTCTAGAGTCTCAA
 GCTTCGGCGCGCC

Figure 76

TTAATTAAGAATTACGAGCTCCACCGCGGAACCTCCTCGGATTCATTGCCAGCTAT
CTGTCACTTTATTGAGAAGATAGTGGAAAAAGGAGGTGGCTCCTACAAATGCCATCAT
TGCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGAT
GGACCCCCACCCACGAGGAGCATCGTGGAAAAAGAAGACGTTCCAACCACGTCTTCA
AAGCAAGTGGATTGATGTGATATCTCCACTGACGTAAGGGATGACGCACAATCCCACT
ATCCTTCGCAAGACCCCTTCTCTATATAAGGAAGTTCATTTCACTTGGAGAGGTATTA
AATCTTAATAGTTTTGATAAAAGCGAACGTGGGGAAACCCGAACCAAACCTTCTTCTA
AACTCTCTCTCATCTCTCTTAAAGCAAACCTTCTCTCTTGTCTTTCTTGCCTGAGCGATC
TTCAACGTTGTCAGATCGTGCTTCGGCACCAGTACAACGTTTTCTTTCACTGAAGCGA
AATCAAAGATCTCTTTGTGGACACGTAGTGCGGCGCCATTAAATAACGTGTACTTGTCT
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CTTGACGAGGTATTGTTGCCTGTACTTCTTTCTTCTTCTTCTTCTTCTTCTTCTTCTA
GAAATCTAGTATTTTCTTTGAAACAGAGTTTTCCCCTGGTTTTCGAACCTGGAGAAAGA
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GTCCTGTTATGCACATTTACAGCTACATAIGCAGACACAATATGTATAGGCTACCATGC
TAACAACTCGACCGACACTGTTGACACAGTACTTGAAAAGAATGTGACAGTGACACAC
TCTGTCAACCTGCTTGAGAACAGTCACAATGGAAAACTATGTCTATTAAGGAATAGC
CCCACTACAATTGGGTAATTGCAGCGTTGCCGGGTGGATCTTAGGAAACCCAGAATG
CGAATTACTGATTTCCAAGGAGTCATGGTCTACATTGTAGAAAAACCAAATCCTGAGA
ATGGAACATGTTACCCAGGGCATTTCGCTGACTATGAGGAACTGAGGGAGCAATTGA
GTTCAGTATCTTCATTTGAGAGGTTCGAAATATCCCCAAAGAAAGCTCATGGCCCCAA
CCACACCGTAACCGGAGTGTCAGCATCATGCTCCATAATGGGGAAAGCAGTTTTTAC
AGAAATTTGCTATGGCTGACGGGGAAGAATGGTTTGTACCCAAACCTGAGCAAGTCTCT
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CACATTATAGCAGAAAATTCACCCCAGAAATAGCCAAAAAGACCCAAAGTAAGAGATCA
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ACCTCAGGGAGCTATAAACAGCAGTCTTCTTTCCAGAACGTACACCCAGTCACAATA
GGAGAGTGTCCAAAGTATGTCAGGAGTGCAAAATTAAGGATGGTTACAGGACTAAGGA
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GGGGTGGACTGGAATGGTAGATGGTTGGTATGGTTATCATCATCAGAAATGAGCAAGG
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AGGTCAATTCTGTAATTGAGAAAATGAACACTCAATTACAGCAGTGGGCAAAGAGTT
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TGCTAAAGAAATAGGAAATGGGTGTTTTGAGTTCTATCACAAGTGTAACGATGAATGCA
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TCTTTAGTTTGAATTTACTGTTATTCGGTGTGCATTTCTATGTTTGGTGAGCGGTTTTCT
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GCAAACTAGGATAAATTATCGCGCGCGGTGTCATCTATGTTACTAGATTCTAGAGTCT
CAAGCTTCGGCGCGCC

Figure 77

TTAATTAAGAATTCGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATCT
 GTCACCTTTATTGAGAAGATAGTGGAAGGAAGGTGGCTCCTACAAATGCCATCATTGC
 GATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGAC
 CCCCACCCACGAGGAGCATCGTGGAAGAAAGACGTTCCAACCACGTCTTCAAAGCAA
 GTGGATTGATGTGATATCTCCACTGACGTAAGGGATGACGCACAATCCCACTATCCTTC
 GCAAGACCCTTCTCTATATAAGGAAGTTCATTTCAATTTGGAGAGGTATTAATCTTAAT
 AGGTTTTGATAAAGCGAACGTGGGGAACCCGAACCAAACCTTCTTCTAACTCTCTCT
 CATCTCTCTTAAAGCAAACCTTCTCTCTTGTCTTTCTTGCGTGAGCGATCTTCAACGTTGTC
 AGATCGTGCTTCGGCACCAGTACAACGTTTTCTTCACTGAAGCGAAATCAAAGATCTCT
 TTGTGGACACGTAGTGCGGCGCCATTAAATAACGTGTACTTGTCTATTCTTGTGCGGTGT
 GGTCTTGGGAAAGAAAGCTTGCTGGAGGCTGCTGTTGAGCCCCATACATTACTTGTTA
 CGATTCTGCTGACTTTCGGCGGGTGCAATATCTCTACTTCTGCTTGACGAGGTATTGTTG
 CCTGTACTTCTTCTTCTTCTTCTTGTGCTGATTGGTCTATAAGAAATCTAGTATTTCTTTG
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 TACAATTGGGTAATTGCAGCGTTGCCGGGTGGATCTTAGGAAACCCAGAATGCGAATTA
 CTGATTTCCAAGGAGTCATGGTCTACATTGTAGAAAAACCAAATCCTGAGAATGGAACA
 TGTTACCCAGGGCATTTCGCTGACTATGAGGAACTGAGGGAGCAATTGAGTTCAGTATC
 TTCATTTGAGAGGTTGAAATATTCCTCCAAAGAAAGCTCATGGCCCAACCACACCGTAAC
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 GCCCTCTATCATACAGAAATGCTTATGTCTCTGTAGTGTCTTCACATTATAGCAGAAAT
 TCACCCAGAAATAGCCAAAGACCCAAAGTAAGAGATCAAGAAGGAAGAATCAATTAAT
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 CGCCAAGATATGCTTTCGCACTGAGTAGAGGCTTTGGATCAGGAATCATCAACTCAAAT
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 GTGCCAAATTAAGGATGGTTACAGGACTAAGGAACATCCCATCCATTCAATCCAGAGGTT
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 TAGAGTCTCAAGCTTCGGCGCGCC

Figure 78

TTAATTAAGAATTGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTAT
 CTGTCACTTTATTGAGAAGATAGTGGAAAAGGAAGGTGGCTCCTACAAATGCCATCATI
 GCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATG
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 AGCATGTAATAATTAACATGTAATGCATGACGTTATTTATGAGATGGGTTTTTATGATTA
 GAGTCCCGCAATTATACATTTAATACGCGATAGAAAACAAAATATAGCGCGCAAACTAG
 GATAAATTATCGCGCGCGGTGTCATCTATGTTACTAGATTCTAGAGTCTCAAGCTTCGG
 CGCGCC

Figure 79

TTAATTAAGAATTGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATC
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 CGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGA
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 AAGTGGATTGATGTGATATCTCCACTGACGTAAGGGATGACGCACAATCCCCTATCCT
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 CTCTCATCTCTCTTAAAGCAAACCTTCTCTTGTCTTTCTTGCCTGAGCGATCTTCAACG
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 AGCTTCGGCGCGCC

Figure 80

TTAATTAAGAATTGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTAT
CTGTCACTTTATTGAGAAGATAGTGAAAAAGGAAGGTGGCTCCTACAAATGCCATCAT
TGCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGAT
GGACCCCCACCCACGAGGAGCATCGTGAAAAAGAAGACGTTCCAACCACGTCTTCA
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AATCTTAATAGGTTTTGATAAAAGCGAACGTGGGGAACCCGAACCAAACCTTCTTCT
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TGCTTGACGAGGTATTGTTGCCTGTACTTCTTCTTCTTCTTCTTGTGATTGGTCTA
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AACGCTACCAGTAAGAGCGGATTTTTCGCAACAATGGCTTGGGCTGTCCCAAAGGAC
AACAACAAAAATGCAACGAACCCACTAACAGTAGAAGTACCATACATTTGTACAGAAG
GGGAAGACCAAATCACTGTTTGGGGGTTCCATTGAGATAACAAAACCCAAATGAAGAA
CCTCTATGGAGACTCAAATCCTCAAAAGTTACCTCATCTGCTAATGGAGTAACCACA
CACTATGTTTCTCAGATTGGCAGCTTCCAGATCAAACAGAAGACGGAGGACTACCAC
AAAGCGGCAGGATTGTTGTTGATTACATGATGCAAAAACCTGGGAAAACAGGAACAAT
TGCTACCAAAGAGGTGTTTTGTTGCCTCAAAAGGTGTGGTGCGCGAGTGGCAGGAG
CAAAGTAATAAAAGGGTCCTTGCCCTTAATTGGTGAAGCAGATTGCCTTCATGAAAAAT
ACGGTGGATTAAACAAAAGCAAGCCTTACTACACAGGAGAACATGCAAAAGCCATAGG
AAATTGCCCAATATGGGTGAAAACACCTTTGAAGCTCGCCAATGGAACCAAATATAGA
CCTCCTGCAAACTATTAAAGGAAAGGGGTTTCTTCGGAGCTATTGCTGGTTTCCTAG
AAGGAGGATGGGAAGGAATGATTGCAGGCTGGCACGGATACACATCTCACGGAGCA
CATGGAGTGGCAGTGGCGGCGGACCTTAAGAGTACGCAAGAAGCTATAAACAAGATA
ACAAAAATCTCAATTCTTTGAGTGAGCTAGAAGTAAAGAATCTTCAAAGACTAAGTGG
TGCCATGGATGAACCTCCACAACGAAATACTCGAGCTGGATGAGAAAGTGGATGATCTC
AGAGCTGACACTATAAGCTCGCAAATAGAACTTGCACTTGGCTTTCCAACGAAGGAA
TAATAAACAGTGAAAGATGAGCATCTATTGGCACTTGAGAGAAAACTAAAGAAAATGCT
GGGTCCCTCTGCTGTAGAGATAGGAAATGGATGCTTCGAAACCAAACACAAGTGCAA
CCAGACCTGCTTAGACAGGATAGCTGCTGGCACCTTTAATGCAGGAGAATTTCTCTC
CCCCTTTTGATTCACTGAACATTACTGCTGCATCTTTAAATGATGATGGATTGGATAA
CCATACTATACTGCTCTATTACTCAACTGCTGCTTCTAGTTTGGCTGTAACATTGATGC
TAGCTATTTTTATTGTTTATATGGTCTCCAGAGACAACGTTTCATGCTCCATCTGTCTAT
AAAGGCCTATTTTCTTTAGTTTGAATTTACTGTTATTCGGTGTGCATTTCTATGTTTGGT
GAGCGGTTTTCTGTGCTCAGAGTGTGTTTATTTTATGTAATTTAATTTCTTTGTGAGCT
CCTGTTTAGCAGGTCGTCCCTTCAGCAAGGACACAAAAAGATTTTAATTTTATTAATAA
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ACATTTGGCAATAAAGTTTCTTAAGATTGAATCCTGTTGCCGGTCTTGCATGATTATC
ATATAATTTCTGTTGAATTACGTTAAGCATGTAATAATTAACATGTAATGCATGACGTTA
TTTATGAGATGGGTTTTTATGATTAGAGTCCCGCAATTATACATTTAATACGCGATAGA
AAACAAAATATAGCGCGCAAACTAGGATAAATTATCGCGCGCGGTGTCATCTATGTTA
CTAGATTCTAGAGTCTCAAGCTTCGGCGCGCC

Figure 81

TTAATTAAGAATTCGAGCTCCACCGCGGAAACCTCCTCGGATTCCATTGCCAGCTATCTGTC
 ACTTTATTGAGAAGATAGTGGAAGGAAGGTGGCTCCTACAAATGCCATCATTGCGATAAAG
 GAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCCCAACCCAC
 GAGGAGCATCGTGGAAGAAAGACGTTCCAACCACGTCTTCAAAGCAAGTGGATTGATGTG
 ATATCTCCACTGACGTAAGGGATGACGCACAATCCCCTATCCTTCGCAAGACCCTTCCTCTA
 TATAAGGAAGTTCATTTTCTTTGGAGAGGTATTAATACTTAATAGGTTTTGATAAAAGCGAAC
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 GTTTTCTTTCACTGAAGCGAAATCAAAGATCTCTTTGTGGACACGTAGTGGCGGCCATTAAA
 TAACGTGTACTTGTCTATTCTTGTGCGGTGTGGTCTTGGGAAAAGAAAGCTTGCTGGAGGCTG
 CTGTTCAAGCCCATACATTACTTGTACGATTCTGCTGACTTTTCGGCGGGTGCAATATCTCTA
 CTTCTGCTTGACGAGGTATTGTTGCCTGTACTTCTTTCTTCTTCTTGCTGATTGGTTCTAT
 AAGAAATCTAGTATTTTCTTGAACAGAGTTTTCCCGTGGTTTTCGAACTTGAGAAAGATTG
 TTAAGCTTCTGTATATTCTGCCCAAATTTGTGCGGGCCCATGGCGAAAAACGTTGCGATTTTCG
 GCTTATTGTTTTCTTCTTGTGTTGGTTCCTTCTCAGATCTTCGCTGATCGAATCTGCACTGG
 AATAACATCTTCAAACCTCACCTCATGTGGTCAAAACAGCCACTCAAGGGGAGGTCAATGTGAC
 TGGTGTGATACCACTAACAAACACCAACAAAATCTTATTTGCAAATCTCAAAGGAACAAGG
 ACCAGAGGGAACTATGCCAGACTGTCTCAACTGCACAGATCTGGATGTGGCTTTGGGCAG
 ACCAATGTGTGTGGGGACCACACCTTCGGCGAAGGCTTCAATACTCCACGAAGTCAAACCTG
 TTACATCCGGGTGCTTTCCTATAATGCACGACAGAACAAAAATCAGGCAACTACCCAATCTTC
 TCAGAGGATATGAAATATCAGGCTATCAACCCAAAACGTCATCGATGCGGAAAAGGCACCA
 GGAGGACCCTACAGACTTGGAACCTCAGGATCTTGCCCTAACGCTACCAAGTAAAGCGGATT
 TTTGCAACAATGGCTTGGGCTGTCCCAAAGGACAACAACAAAAATGCAACGAACCCACTAAC
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 AGATAACAAAACCCAAATGAAGAACCTCTATGGAGACTCAAATCCTCAAAAGTTACCTCATCT
 GCTAATGGAGTAACCACACACTATGTTTCTCAGATTGGCAGCTTCCCAGATCAAACAGAAGAC
 GGAGGACTACCACAAAGCGGCAGGATTGTTGTTGATTACATGATGCAAAAACCTGGGAAAAC
 AGGAACAATTGTCTACCAAAGAGGTGTTTTGTTGCCTCAAAGGTGTGGTGCGCGAGTGGCA
 GGAGCAAAGTAATAAAAGGGTCTTGCCTTTAATTGGTGAAGCAGATTGCCTTCATGAAAAAT
 ACGGTGGATTAACAAAAGCAAGCCTTACTACACAGGAGAACATGCAAAAGCCATAGGAAATT
 GCCCAATATGGGTGAAAACACCTTTGAAGCTCGCCAATGGAACCAAATATAGACCTCCTGCAA
 AACTATTAAGGAAAGGGGTTTTCTCGGAGCTATTGCTGGTTTTCTAGAAGGAGGATGGGAA
 GGAATGATTGCAGGCTGGCACGGATACACATCTCACGGAGCACATGGAGTGGCAGTGGCGG
 CGGACCTTAAGAGTACGCAAGAAGCTATAAACAAGATAACAAAAAATCTCAATTCTTTGAGTGA
 GCTAGAAGTAAGAATCTTCAAAGACTAAGTGGTGGCATGGATGAACTCCACAACGAAATACT
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 CAGTCTTGCTTTCCAACGAAGGAATAATAAACAGTGAAGATGAGCATCTATTGGCACTTGAGA
 GAAAACTAAAGAAAATGCTGGGTCCCTCTGCTGTAGAGATAGGAAATGGATGCTTCGAAACCA
 AACACAAGTGCAACCAGACCTGCTTAGACAGGATAGCTGCTGGCACCTTTAATGCAGGAGAA
 TTTTCTCTCCCACTTTTGATTCACTGAACATTACTGCTGCATCTTTAAATGATGATGGATTGG
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 ATTATACATTTAATACGCGATAGAAAACAAAATATAGCGCGCAAACCTAGGATAAATTATCGCGC
 GCGGTGTCATCTATGTTACTAGATTCTAGAGTCTCAAGCTTCGGCGCGCC

Figure 82

ATGTTTGGGCGCGGACCAACAAGGAAGAGTGATAACACCAAATATTACGATATTCT
TGGTGTTTCAAAAAGTGCTAGTGAAGATGAAATCAAGAAAGCCTATAGAAAGGCAG
CGATGAAGAACCATCCAGATAAGGGTGGGGATCCTGAGAAGTTCAAGGAGTTGGG
CCAAGCATATGAAGTGTTGAGCGATCCTGAAAAGAAAGAACTGTATGATCAATATG
GTGAAGATGCCCTTAAAGAAGGAATGGGGGGAGGCGCAGGAAGCTCATTTCATAA
TCCGTTTGATATTTTGAATCATTTTTTGGTGCAGGCTTTGGTGGTGGTGGTCCTT
CACGCGCAAGAAGACAGAAGCAAGGAGAAGATGTGGTGCATTCTATAAAGGTTTC
CTTGGAGGATGTGTATAACGGCACTACAAAGAAGCTATCACTTTCTAGGAATGCAC
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Figure 83

AAGCTTGCATGCCTGCAGGTCGACTCTAGAGGATCCCCGGGCTGGTCTGTACATT
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GAATCTGTTGCCGGTCTTGCGATGATTATCATATAATTTCTGTTGAATTACGTTAAGCATGTAATAATTAACATG
TAATGCATGACGTTATTTATGAGATGGGTTTTATGATTAGAGTCCCGCAATTATACATTAATACGCGATAGAA
AACAAAATATAGCGCGCAAACTAGGATAAATTATCGCGCGGGTGTCTATGTTACTAGATCGAATTC

Figure 84

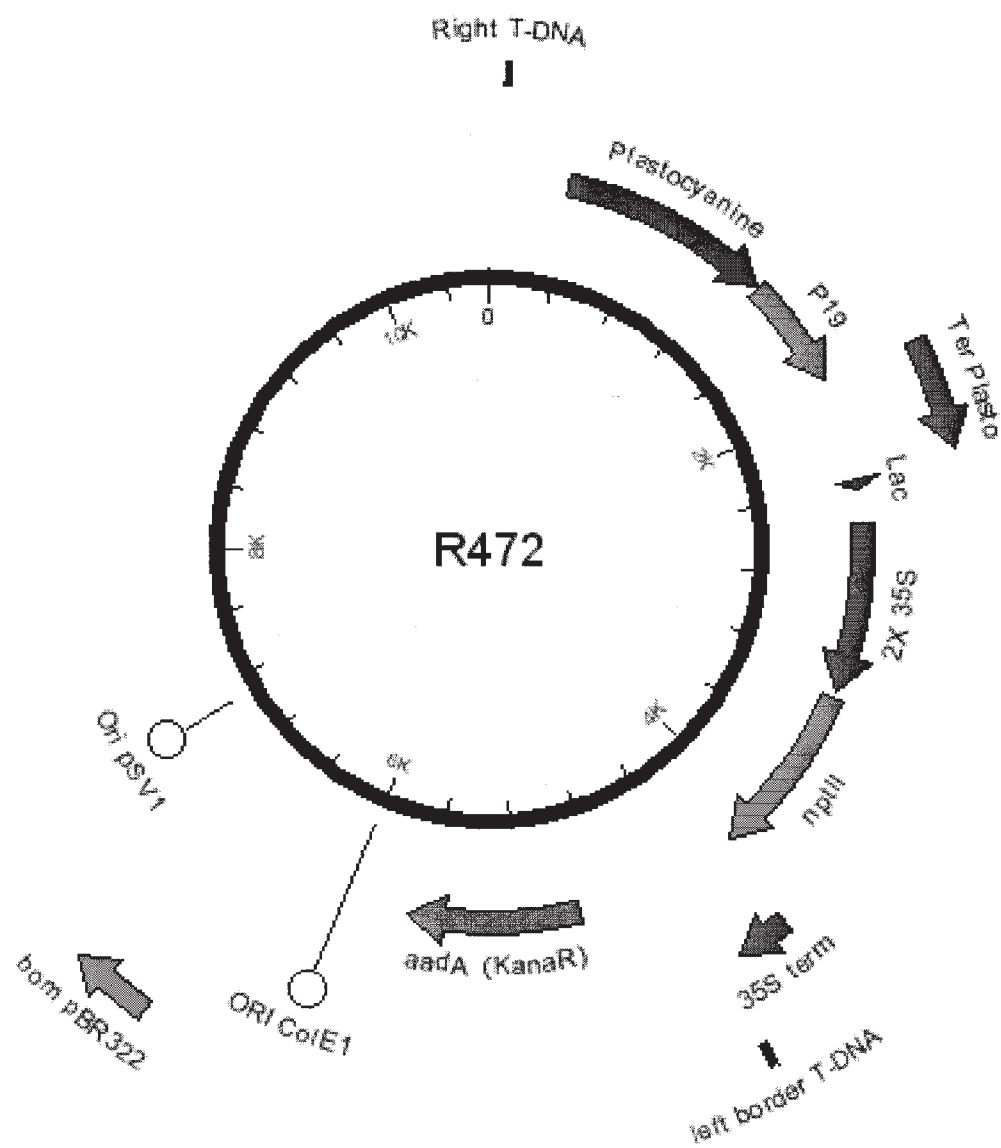
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CAGAAACTGTATATCATATCTATGTGAGAGAAAGGGGAACATTTGAGATGGAGTCCATTTACTTGAGGTATACTTATTA
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ATAGAATAAGCGCTTATCATATAAGTGCTTTTGTACAGTTATTTCTATGAAAGTAGAAGAAAATAGTCATTGTTTTAATA
TAAGCTATCCTGGAGAGCTTGTGAAATAACCAGAAAAGAACTTATGGACACGTCATGAGCTGTTTACATAAGATCTC
CCTAACAGTCTCAAAAGTGTTTATGCCAGTAGATAAATTCAAATAAGTCAATCTAAACAGACCCCTAAATCCATTATGGTA
CCTATCATTTTAGCTTATCCATCTTTATTAAGAATGTCATGAGATAACATAATGATAACACATTATTTTGACACAAATGG
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CAAGTTTGAAAGTAATTTTGTAGCATATGTTGAGCTACCTCAAAATTTACATGATCACCTAGCATTAGCTCTTTGCACTT
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CAAGATTTTTTTTATTAATGAGATGATGTGTTTGTGACTGAGATTGAGTCATACATTTCACTAAGAAATGGTTCCAGTA
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GATCATTGCTAATGATCAAGGAAACAGAACACGCCATCTTACGTTGCTTTTCAACGACTCCGAGAGGTTGATCGGTGA
CGCAGCTAAGAATCAGGTCGCCATGAACCCCGTTAACACCGTTTTCGACGCTAAGAGGTTGATCGGTGCTGTTTCTC
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TGCTGAGGCTTACCTTGGTGTACAACTCAAGAACGCCGTTGTTACCGTTCCAGCTTACTTCAACGACTCTCAGCGTCA
GGCTACAAGGATGCTGGTGTCTGCTGGTTTGAACGTTATGCGAATCATCAACGAGCCTACAGCCGCCGCTATTG
CCTACGGTCTTGACAAAAAGGCTACCAGCGTTGAGAGAGAAGATGTTCTTATCTTCCATCTTGGTGGTGGCACTTTTG
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GACAAGATGAAGGAATTGGAGAGCATCTGCAACCAATCATTGCCAAGATGTACCAAGGAGCTGGTGGTGAAGCCGG
TGGTCCAGGTGCCTCTGGTATGGACGATGATGCTCCCCCTGCTTCAGGCGGTGCTGGACCTAAGATCGAGGAGGTC
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GTCTTGCAGTGCAGGATTCTATCATATAAATTTCTGTTGAATTAGCTAAGCATGTAATAATTAACATGATGACGCTTATTA
TGAGATGGGTTTTATGATTAGAGTCCCGCAATTATACATTTAATACCGGATAGAAAACAAAATATAGCGCGCAACTA
GGATAAATTATCGCGCGCGGTGTATCTATGTTACTAGATCGAATTC

Figure 85A

AAGCTTGCATGCCTGCAGGTCGACTCTAGAGGATCCCCGGGCTGGTCTGTACATTATCTTGCCGCCTTTGCATTCA
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Figure 86



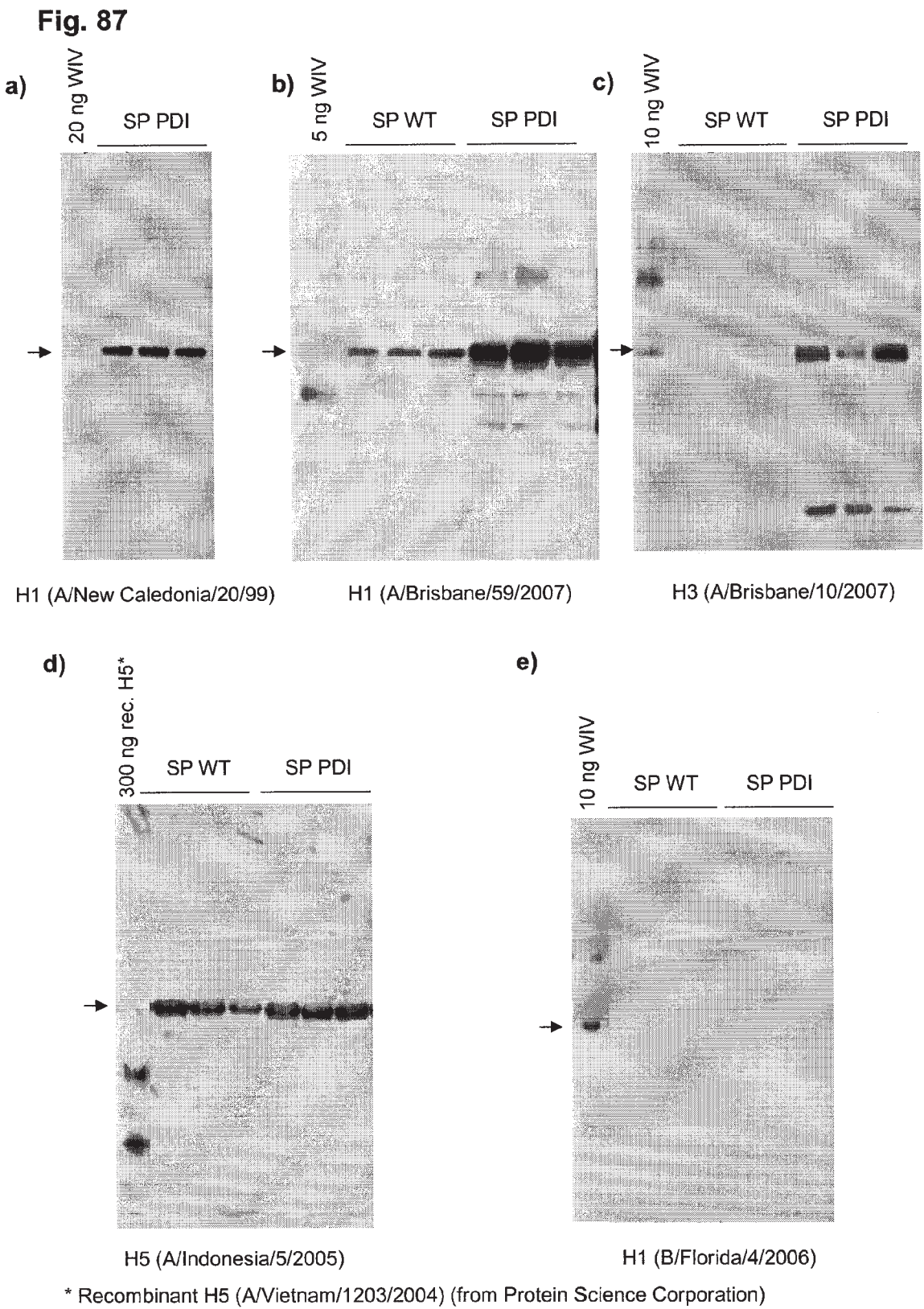
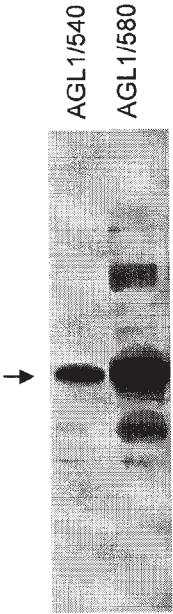
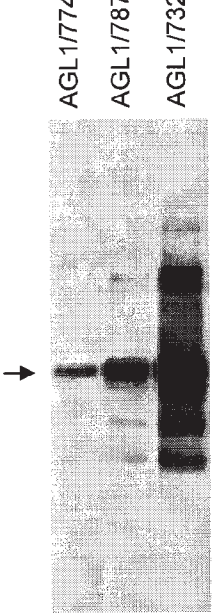


Fig. 88

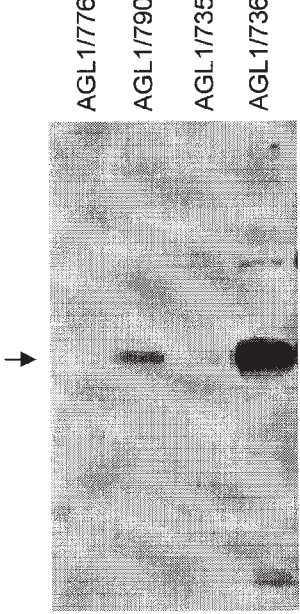
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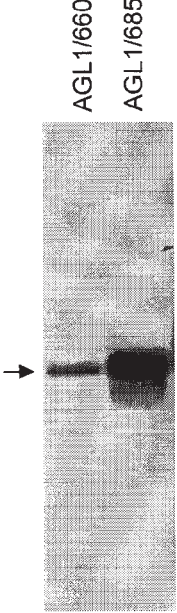
b) H1 Brisbane



c) H3 Brisbane



d) H5 Indo



e) B Florida

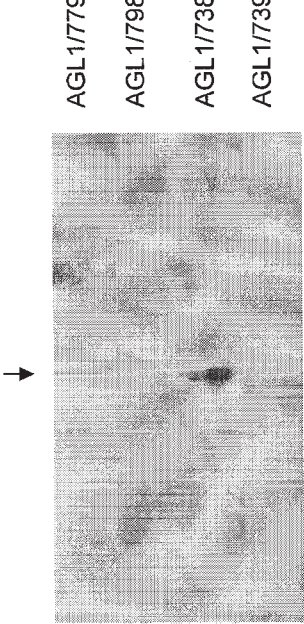


Fig. 89

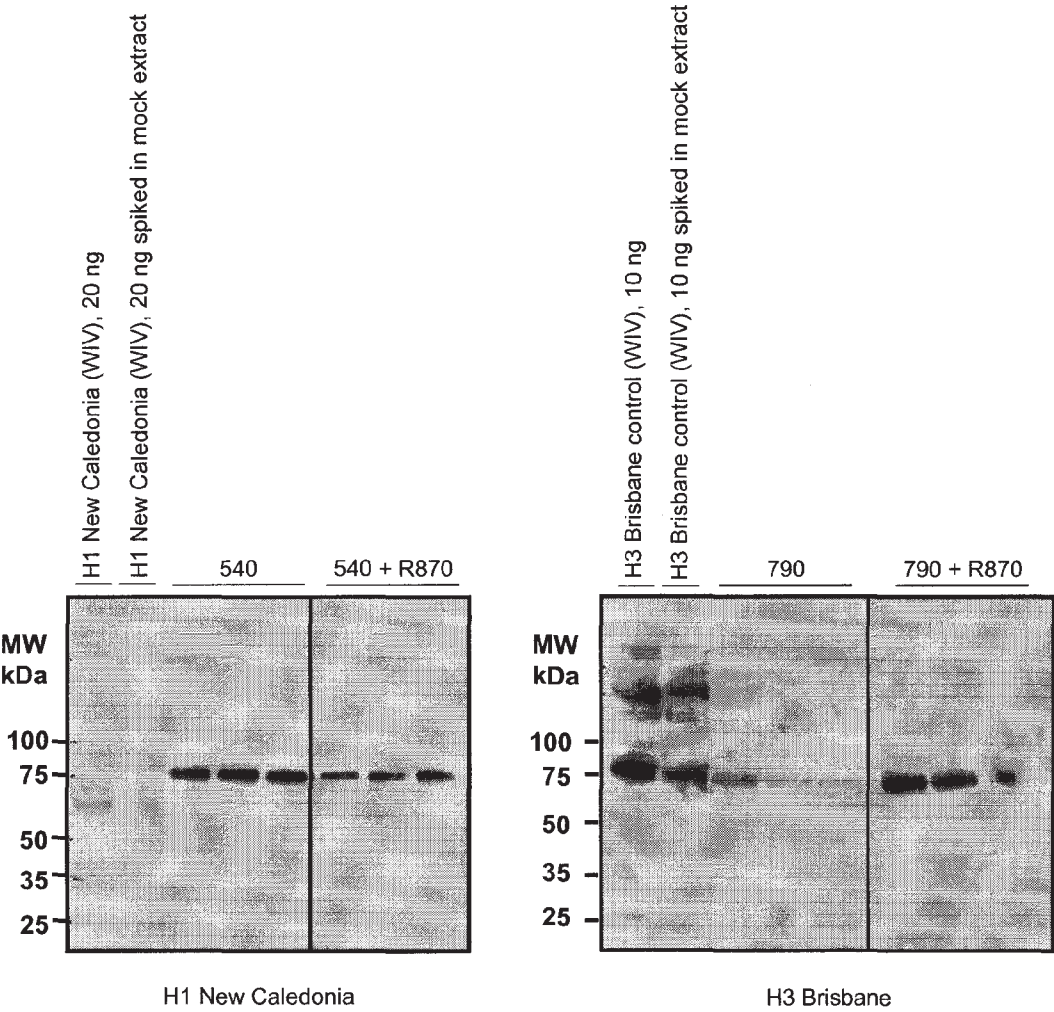


Fig. 90

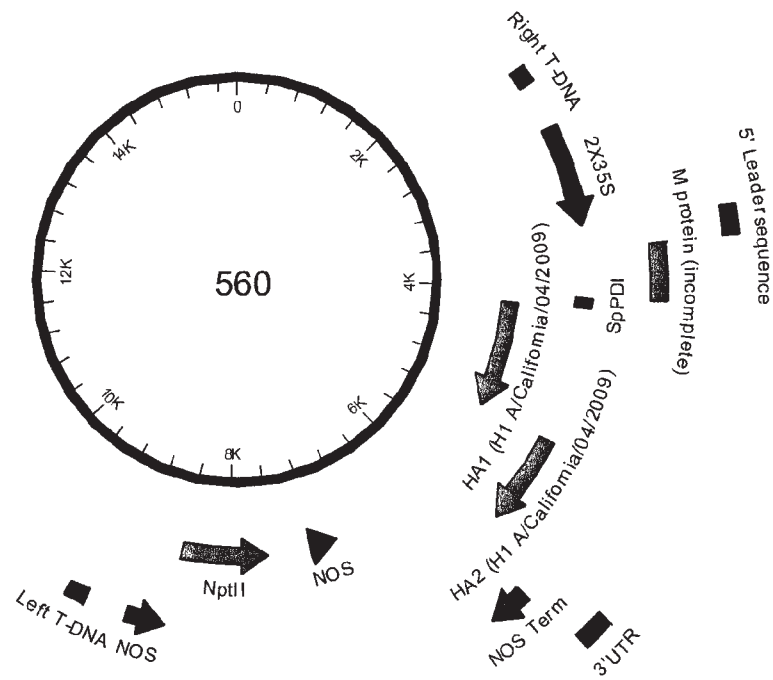
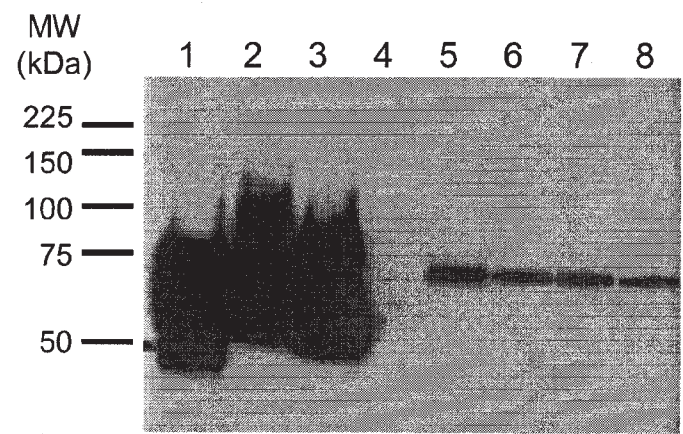


Fig. 91



GTCAACATGGTGGAGCACGACACACTTGTCTACTCCAAAATATCAAAGATACAGTCTCAGAAGACCAAAAGGGCAATT
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ATAGTGGAAAAGGAAGGTGGCTCCTACAAATGCCATCATTGCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGC
CGACAGTGGTCCCAAAGATGGACCCCCACCCACGAGGAGCATCGTGGAAGAAAGACGTTCCAACCACGCTCTTCA
AAGCAAGTGGATTGATGATAACATGGTGGAGACGACACACTTGTCTACTCCAAAATATCAAAGATACAGTCTCA
GAAGACCAAAAGGGCAATTGAGACTTTTCAACAAAGGGTAATATCCGGAAACCTCCTCGGATTCCATTGCCAGCTATC
TGTCACCTTTATTGTGAAGATAGTGGAAAAGGAAGGTGGCTCCTACAAATGCCATCATTGCGATAAAGGAAAGGCCATC
GTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCCCCACCCACGAGGAGCATCGTGGAAGAAAGACG
TTCCAACCACGCTCTTCAAAGCAAGTGGATTGATGTGATATCCTCACTGACGTAAGGGATGACGCACAATCCCACTATC
CTTCGCAAGACCCTTCTCTATATAAGGAAGTTCATTTTCATTTGGAGAGGCTATTAATAATAGGTTTTGATAAAA
GCGAACGTGGGGAAACCCGAACCAAACCTTCTCTAACTCTCTCTCACTCTCTTTAAAGCAAACCTTCTCTTTGCTT
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GATCTTCGCTGACACATTATGTATAGGTTATCATCGGAACAATTCAACAGACACTGTAGACACAGTACAGTAAAAAG
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CAAGCTCATGGTCTACATTGTGGAACACCTAGTTCAGACAATGGAACGTGTTACCCAGGAGATTTTCATCGATTA
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CGATAGAAAAACAAAATATAGCGCGCAAACTAGGATAAATTATCGCGCGCGGTGTCATCTATGTTACTAGAT

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DGWYGYHHQNEQSGSYAADLKSTQNAIDEITNKVNSVIEKMNTQFTAVGKEFNHLEKRIENLNKKVDDGFLDI
WTYNAELLVLENERLTLDYHDSNVKNLYEKVRSQKNNAKEIGNGCFEFYHKDNTCMESVKNGTYDYPKYS
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Fig. 93

2X35S promoter sequence (SEQ ID NO:129)

GTCAACATGGTGGAGCACGACACACTTGTCTACTCCAAAAATATCAAAGATACAGTC
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AGGTGGCTCCTACAAATGCCATCATTGCGATAAAGGAAAGGCCATCGTTGAAGATG
CCTCTGCCGACAGTGGTCCCAAAGATGGACCCCCACCCACGAGGAGCATCGTGGA
AAAAGAAGACGTTCCAACCACGTCTTCAAAGCAAGTGGATTGATGTGATAACATGG
TGGAGCACGACACACTTGTCTACTCCAAAAATATCAAAGATACAGTCTCAGAAGACC
AAAGGGCAATTGAGACTTTTCAACAAAGGGTAATATCCGGAAACCTCCTCGGATTC
CATTGCCCAGCTATCTGTCACCTTTATTGTGAAGATAGTGGAAAAGGAAGGTGGCTC
CTACAAATGCCATCATTGCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCG
ACAGTGGTCCCAAAGATGGACCCCCACCCACGAGGAGCATCGTGGAAAAAGAAGA
CGTTCCAACCACGTCTTCAAAGCAAGTGGATTGATGTGATATCTCCACTGACGTAA
GGGATGACGCACAATCCCACTATCCTTCGCAAGACCCTTCCTCTATATAAGGAAGT
TCATTTCAATTGGAGAGG

Fig. 94

Intermediary expression cassette number 972, from PacI (upstream promoter) to Ascl (immediately downstream NOS terminator). 2X35S promoter sequence is underlined. Mutated ATG are boxed. Apal restriction site (immediately downstream ATG for protein coding sequence to be express, in this case HA0 of H5 A/Indonesia), is shaded. (SEQ ID NO:134)

TTAATTAAGTCGACAAGCTTGCATGCCTGCAGGTCAACATGGTGGAGCACGACACACTTGTCTACTCCA
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AAACCTCCTCGGATTCCATTGCCAGCTATCTGTCACCTTATTGTGAAGATAGTGGAAAAGGAAGGTGGC
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GTGGATTGATGTGATAACATGGTGGAGCACGACACACTTGTCTACTCCAAAAATATCAAAGATACAGTCT
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CGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCCCCACCCA
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ACCCAACAATAAAGAAAAGCTACAATAATACCAACCAAGAGGATCTTTTGGTACTGTGGGGAATTCACCA
TCCTAATGATGCGGCAGAGCAGACAAGGCTATATCAAAACCCAACCACTATATTTCCATTGGGACATCA
ACACTAAACCAGAGATTGGTACCAAAAATAGCTACTAGATCCAAAGTAAACGGGCAAAGTGGAAGGATG
GAGTTCTTCTGGACAATTTTAAACCTAATGATGCAATCAACTTCGAGAGTAATGGAATTTTCATTGCTCC
AGAATATGCATACAAAATTGTCAAGAAAGGGGACTCAGCAATTATGAAAAGTGAATTGGAATATGGTAAC
TGCAACACCAAGTGTCAAACCTCAATGGGGGCGATAAACTCTAGTATGCCATTCCACAACATACACCCTC
TCACCATCGGGGAATGCCCAAATATGTGAAATCAAACAGATTAGTCCTTGCAACAGGGCTCAGAAATA
GCCCTCAAAGAGAGAGCAGAAGAAAAAAGAGAGGACTATTTGGAGCTATAGCAGTTTTATAGAGGGAG
GATGGCAGGGAATGGTAGATGGTTGGTATGGGTACCACCATAGCAATGAGCAGGGGAGTGGGTACGCT
GCAGACAAAGAATCCACTCAAAGGGCAATAGATGGAGTCACCAATAAGGTCAACTCAATCATTGACAAAA
TGAACACTCAGTTTGAGGCGGTTGGAAGGGAATTAATACTTAGAAAGGAGAATAGAGAATTTAAACAA
GAAGATGGAAGACGGGTTCTAGATGTCTGGACTTAAATGCCGAACCTTCTGGTTCTCATGAAAAATGAG
AGAACTCTAGACTTTCATGACTCAAATGTTAAGAACCTCTACGACAAGGTCCGACTACAGCTTAGGGATA
ATGCAAAGGAGCTGGGTAACGGTTGTTTCGAGTTCTATCACAAATGTGATAATGAATGTATGGAAAGTAT
AAGAAACGGAACGTACAACATCCGCGAGTATTCAGAAGAAGCAAGATTAAGAAAGAGAGGAAATAAGTGG
GGTAAATTTGAATCAATAGGAACCTTACCAAACTGTCAATTTATTCAACAGTGGCGAGTTCCTTAGCA
CTGGCAATCATGATGGCTGGTCTATCTTTATGGATGTGCTCCAATGGATCGTTACAATGCAGAATTTGCA
TTTAAAGGCCTATTTTCTTATGTTTGAATTTACTGTTATTCGGTGTGCATTTCTATGTTTGGTGAAGCGGTTT
TCTGTGCTCAGAGTGTGTTTATTTATGTAATTTAATTTCTTTGTGAGCTCCTGTTTAGCAGGTCTGTCCT
TCAGCAAGGACACAAAAAGATTTTAAATTTATTAATAAAAAAAGACCGGGAATTCGATATCAAT
GCTTATCGACCTGCAGATCGTTCAAACATTTGGCAATAAAGTTTCTTAAGATTGAATCCTGTTGCCGGTC
TTGCGATGATTATCATATAATTTCTGTTGAATTACGTTAAGCATGTAATAATTAACATGTAATGCATGACGT
TATTTATGAGATGGGTTTTATGATTAGAGTCCCGCAATTATACATTTAATACGCGATAGAAAACAAAATAT
AGCGCGCAAACTAGGATAAATTATCGCGCGCGGTGTCATCTATGTTACTAGATTCTAGAGTCTCAAGCTT
CGGCGCGCC

Fig. 95

Native H1 A/California/4/2009 sequence. Native H1 A/California/4/2009 signal peptide is underlined. SacI and StuI restriction sites are boxed. (SEQ ID NO:135)

ATGAAGGCAATACTAGTAGTTCTGCTATATACATTTGCAACCGCAAATG
CAGACACATTATGTATAGGTTATCATGCGAACAATTCAACAGACACTGT
AGACACAGTACTAGAAAAGAATGTAAACAGTAACACACTCTGTTAACCTT
CTAGAAGACAAGCATAACGGGAAACTATGCAAACCTAAGAGGGGTAGCC
CCATTGCATTTGGGTAAATGTAAACATTGCTGGCTGGATCCTGGGAAAT
CCAGAGTGTGAATCACTCTCCACAGCAAGCTCATGGTCCTACATTGTG
GAAACACCTAGTTCAGACAATGGAACGTGTTACCCAGGAGATTTTCATC
GATTATGAGGAGCTAAGAGAGCAATTGAGCTCAGTGTCATCATTTGAA
AGGTTTGAGATATTCCCCAAGACAAGTTCATGGCCCAATCATGACTCG
AACAAAGGTGTAACGGCAGCATGTCCTCATGCTGGAGCAAAAAGCTTC
TACAAAAATTTAATATGGCTAGTTAAAAAAGGAAATTCATACCCAAAGC
TCAGCAAATCCTACATTAATGATAAAGGGAAAGAAGTCCTCGTGCTATG
GGGCATTCACCATCCATCTACTAGTGCTGACCAACAAAGTCTCTATCA
GAATGCAGATACATATGTTTTTGTGGGGTCATCAAGATACAGCAAGAA
GTTCAAGCCGGAAATAGCAATAAGACCCAAAGTGAGGGATCAAGAAG
GGAGAATGAACTATTACTGGACACTAGTAGAGCCGGGAGACAAAATAA
CATTCGAAGCAACTGGAAATCTAGTGGTACCGAGATATGCATTTCGCAA
TGGAAAGAAATGCTGGATCTGGTATTATCATTTTCAGATACACCAGTCCA
CGATTGCAATACAACCTTGTCAAACACCCAAGGGTGCTATAAACACCAG
CCTCCCATTTTCAGAATATACATCCGATCACAATTGGAAAATGTCCAAAA
TATGTAAAAAGCACAAAATTGAGACTGGCCACAGGATTGAGGAATATC
CCGTCTATTCAATCTAGAGGCCTATTTGGGGCCATTGCCGGTTTTATTG
AAGGGGGGTGGACAGGGGATGGTAGATGGATGGTACGGTTATCACCAT
CAAAATGAGCAGGGGTCAGGATATGCAGCCGACCTGAAGAGCACACA
GAATGCCATTGACGAGATTACTAACAAAGTAAATTCTGTTATTGAAAAG
ATGAATACACAGTTCACAGCAGTAGGTAAAGAGTTCAACCACCTGGAA
AAAAGAATAGAGAATTTAAATAAAAAAGTTGATGATGGTTTCCTGGACA
TTTGGACTTACAATGCCGAACTGTTGGTTCTATTGGAAAATGAAAGAAC
TTTGGACTACCACGATTCAAATGTGAAGAACTTATATGAAAAGGTAAAG
AGCCAGCTAAAAAACAATGCCAAGGAAATTGGAAACGGCTGCTTTGAA
TTTTACCACAAATGCGATAACACGTGCATGGAAAGTGTCAAAAATGGG
ACTTATGACTACCCAAAATACTCAGAGGAAGCAAAATTAACAGAGAAG
AAATAGATGGGGTAAAGCTGGAATCAACAAGGATTTACCAGATTTTGG
CGATCTATTCAACTGTCGCCAGTTCATTGGTACTGGTAGTCTCCCTGG
GGGCAATCAGTTTCTGGATGTGCTCTAATGGGTCTCTACAGTGTAGAA
TATGTATTAA

Final sequence to be synthesized containing the H1 A/California/4/2009 sequence. M protein portion from DrIII to Apal restriction site is underlined. PDISP is in bold. Mutated SacI and StuI restriction sites are boxed. (SEQ ID NO:136)

117/119

Fig. 97

Synthesized fragment 1 (SEQ ID NO:137)

ATGCTAATATCACGTAGTGC GGCGCCATTAATAACGTGTACTTGTCTATTCTTGTGGTGTGGTCTT
GGGAAAAGAAAGCTTGCTGGAGGCTGCTGTT CAGCCCCATACATTACTTGTTACGATTCTGCTGACTT
TCGGCGGGTGCAATATCTCTACTTCTGCTTGACGAGGTATTGTTGCCTGTACTTCTTTCTTCTTCT
TGCTGATTGGTTCTATAAGAAATCTAGTATTTTCTTTGAAACAGAGTTTTCCCGTGGTTTTGCAACTTG
GAGAAAGATTGTTAAGCTTCTGTATATTCTGCCCAAATTTGTGGGGCCCATGGCGAAAAACGTTGCGA
TTTTCGGCTTATTGTTTTCTTTCTTGTGTTGGTTCTTCTCAGATCTTCGCTGACACATTATGTATAGG
TTATCATGCGAACAATTCAACAGACACTGTAGACACAGTACTAGAAAAGAATGTAACAGTAACACACTC
TGTTAACCTTCTAGAAGACAAGCATAACGGGAAACTATGCAAATAAGAGGGGTAGCCCCATTGCATT
TGGGTAAATGTAACATTGCTGGCTGGATCCTGGGAAATCCAGAGTGTGAATCACTCTCCACAGCAAG
CTCATGGTCCTACATTGTGGAACACCTAGTTCAGACAATGGAACGTGTTACCCAGGAGATTTTCATCG
ATTATGAGGAGCTAAGAGAGCAATTAAGC

Synthesized fragment 2 (SEQ ID NO:138)

TGGAAACACCTAGTT CAGACAATGGAACGTGTTACCCAGGAGATTTTCATCGATTATGAGGAGCTAAGA
GAGCAATTAAGCTCAGTGT CATCATTTGAAAGGTTTGAGATATTCCCCAAGACAAGTTTCATGGCCCAA
TCATGACTCGAACAAAGGTGTAAACGGCAGCATGTCCTCATGCTGGAGCAAAAAGCTTCTACAAAAATT
TAATATGGCTAGTTAAAAAAGGAAATTCATACCCAAAGCTCAGCAAATCCTACATTAATGATAAAGGGA
AAGAAGTCCTCGTGCTATGGGGCATTCCACATCCATCTACTAGTGCTGACCAACAAAGTCTCTATCAG
AATGCAGATACATATGTTTTGTGGGGTCATCAAGATACAGCAAGAAGTTCAAGCCGGAAATAGCAAT
AAGACCCAAAGTGAGGGATCAAGAAGGGAGAATGAACTATTACTGGACACTAGTAGAGCCGGGAGAC
AAAATAACATTGCAAGCAACTGGAATCTAGTGGTACCGAGATATGCATTTCGCAATGGAAGAAATGC
TGGATCTGGTATTATCATTT CAGATACACCAGTCCACGATTGCAATACAACCTTGTCAAACACCCAAGG
GTGCTATAAACACCAGCCTCCCATTT CAGAATATACATCCGATCACAATTGGAATGTCCAAATATG
TAAAAAGCACAAAATTGAGACTGGCCACAGGATTGAGGAATATCCCGTCTATTCAATCTAGAGGACTA
TTTGGGGCCATTGCCGGTTTCATTGAAGGGGGGTGGACAGGGATGGTAGATGGATGGTACGGTTATC
ACCATCAAAATGAGCAGGGGT CAGGATATGCAG

Synthesized fragment 3 (SEQ ID NO:139)

TTGAAGGGGGGTGGACAGGGATGGTAGATGGATGGTACGGTTATCACCATCAAAATGAGCAGGGGT
CAGGATATGCAGCCGACCTGAAGAGCACACAGAATGCCATTGACGAGATTACTAACAAAGTAAATTCT
GTTATTGAAAAGATGAATACACAGTTCACAGCAGTAGGTAAAGAGTTCAACCACCTGGAAAAAGAAT
AGAGAATTTAAATAAAAAAGTTGATGATGGTTTCTGGACATTTGGACTTACAATGCCGAAGTGTGGT
TCTATTGGAAAATGAAAGAACTTTGGACTACCACGATTCAAATGTGAAGAACTTATATGAAAAGGTAAG
AAGCCAGCTAAAAACAATGCCAAGGAAATTGGAACGGCTGCTTTGAATTTACCACAAATGCGATA
ACACGTGCATGGAAAGTGTCAAAAATGGGACTTATGACTACCCAAAATACTCAGAGGAAGCAAAATTA
AACAGAGAAGAAATAGATGGGGTAAAGCTGGAATCAACAAGGATTTACCAGATTTTGGCGATCTATTC
AACTGTCGCCAGTTCAATTGGTACTGGTAGTCTCCCTGGGGCAATCAGTTTCTGGATGTGCTCTAATG
GGTCTCTACAGTGTAGAATATGTATTTAAAGGCCTAATA

Fig. 98

Expression cassette number 560, from PacI (upstream promoter) to Ascl (immediately downstream NOS terminator).
 PDISP-HA0 H1 A/California/4/2009 sequence is underlined. (SEQ ID NO:146)

TTAATTAAGTCGACAAGCTTGCATGCCTGCAGGTCAACATGGTGGAGCAGACACACTTGTCTACTCCAAAAATA
TCAAAGATACAGTCTCAGAAGACCAAAGGGCAATTGAGACTTTTCAACAAAGGGTAATATCCGGAAACCTCCTCG
GATTCCATTGCCAGCTATCTGTCACTTTATTGTGAAGATAGTGGAAGGAAGGTGGCTCCTACAAATGCCATCA
TTGCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGTCCCAAAGATGGACCCCAACCCACGA
GGAGCATCGTGGAAAAAGAAGACGTTCCAACCACGTCTTCAAAGCAAGTGGATTGATGTGATAACATGGTGGAGC
ACGACACACTTGTCTACTCCAAAAATATCAAAGATACAGTCTCAGAAGACCAAAGGGCAATTGAGACTTTTCAACA
AAGGGTAATATCCGGAAACCTCCTCGGATTCCATTGCCAGCTATCTGTCACTTTATTGTGAAGATAGTGGAAGGA
GAAGGTGGCTCCTACAAATGCCATCATTGCGATAAAGGAAAGGCCATCGTTGAAGATGCCTCTGCCGACAGTGGT
CCCAAAGATGGACCCCAACCCACGAGGAGCATCGTGGAAAAAGAAGACGTTCCAACCACGCTTCAAAGCAAGT
GGATTGATGTGATATCTCCACTGACGTAAGGGATGACGACAAATCCCACTATCCTTCGCAAGACCCCTCCTCTATA
TAAGGAAGTTCATTTCAATTTGGAGAGGTATTAATACTTAATAGGTTTTGATAAAGCGAACGTGGGGAAACCCGA
ACCAAACCTTCTTCTAAACTCTCTCATCTCTCTTAAAGCAAACCTTCTCTTTGCTTTTCTGCGTGAGCGATCTT
CAACGTTGTCAGATCGTGCTTCGGCACCAGTACAACGTTTTCTTCACTGAAGCGAAATCAAAGATCTCTTTGTGG
ACACGTAGTGCGGCGCCATTAAATAACGTGTACTTGTCTATTCTTGTCTGCTGATTGGTTCTATAAAGAAATCTAGTATTT
TCTTTGAAACAGAGTTTTCCCGTGGTTTTCGAACTTGGAGAAAGATTGTTAAGCTTCTGTATATTCTGCCAAATTT
GTCGGGCCCATGGCGAAAAACGTTGCGATTTTCGGCTTATTGTTTTCTCTTCTTGTGTTGGTTCCCTCTCAGATCT
TGCTGACACATTATGTATAGGTTATCATGCGAACAATTCAACAGACACTGTAGACACAGTACTAGAAAAAGATGT
AACAGTAACACACTCTGTTAACCTTCTAGAAGACAAGCATAACGGGAAACTATGCAAACTAAGAGGGGTAGCCCC
ATTGCATTTGGGTAAATGTAACATTGCTGGCTGGATCCTGGGAAATCCAGAGTGTGAATCACTCTCCACAGCAAG
CTCATGGTCTTACATTGTGGAACACCTAGTTCAGACAATGGAACGTGTTACCCAGGAGATTTATCGATTATGAG
GAGCTAAGAGAGCAATTAAGCTCAGTGTCAATCATTTGAAAGGTTTGAGATATCCCAAGACAAGTTCATGGCCCA
ATCATGACTCGAACAAGGTGTAACGGCAGCATGTCCTCATGCTGGAGCAAAAAGCTTCTACAAAAATTTAATATG
GCTAGTTAAAAAAGGAAATTCATACCCAAAGCTCAGCAAAATCCTACATTAATGATAAAGGGGAAAGAGTCCCTCGTG
CTATGGGGCATTACCATCCATCTACTAGTGCTGACCAACAAAGTCTCTATCAGAATGCAGATACATATGTTTTTG
TGGGGTCAACAAGATACAGCAAGAAGTTCAAGCCGGAATAGCAATAAGACCCAAAGTGAGGGATCAAGAAGGG
AGAAATGAAGTATTACTGGACACTAGTAGAGCCGGGAGACAAAATAACATTCGAAGCAACTGGAAATCTAGTGGTA
CCGAGATATGCATTCGCAATGGAAGAAATGCTGGATCTGGTATTATCATTTAGATACACCAAGTCCACGATTGCA
ATACAACCTGTCAAACACCCAAAGGGTGTATAAACACCAAGCCTCCCATTTAGAAATATACATCCGATCACAATTGG
AAAATGTCCAAAATATGTAAAAAGCACAAAATGAGACTGGCCACAGGATTGAGGAATATCCCGTCTATTCAATCT
AGAGGACTATTTGGGGCCATTGCCGGTTTTATTGAAGGGGGGTGGACAGGGATGGTAGATGGATGGTACGGTTA
TCACCATCAAAATGAGCAGGGGTGTCAGGATATGCAGCCGACCTGAAGAGCACACAGAATGCCATTGACGAGATTA
CTAACAAAGTAAATTTCTGTTATTGAAAAGATGAATACACAGTTCACAGCAGTAGGTAAAGAGTTCAACCACCTGGA
AAAAAGAATAGAGAATTTAAATAAAAAAGTTGATGATGGTTTCTGAGCATTTGGACTTACAATGCCGAAGTGTG
GTCTATTGGAAAATGAAAGAATTTGGACTACCACGATTCAAATGTGAAGAATTTATGAAAAGGTAAAGAAGCC
AGCTAAAAAACAATGCCAAGGAAATTTGAAACGGCTGCTTTGAATTTACCACAAATGCCGATAACACGTGCATGGA
AAGTGTCAAAAATGGGACTTATGACTACCCAAAATCTCAGAGGAAGCAAAATTAACAGAGAAGAAATAGATGGG
GTAAAGCTGGAATCAACAAGGATTTACCAGATTTGGCGATCTATTCAACTGTCGCCAGTTCATTGGTACTGGTAG
TCTCCCTGGGGGCAATCAGTTTCTGGATGTGCTCTAATGGTCTCTACAGTGTAGAATATGATTTAAAGGCCTAT
TTCTTTAGTTTGAATTTACTGTTATTGCGGTGTGCATTTCTATGTTTGGTGAGCGGTTTTCTGTGCTCAGAGTGTGT
TTATTTTATGTAATTTAATTTCTTTGTGAGCTCCTGTTAGCAGGTCGTCCCTTCAGCAAGGACACAAAAAGATTTT
AATTTTATTAATAAAAAAAAAAAAAAAAAAGACCGGGAATTCGATATCAAGCTTATCGACCTGCAGATCGTTCAAACATT
TGGCAATAAAGTTTCTTAAGATTGAATCCTGTTGCCGGTCTTGCGATGATTATCATATAATTTCTGTTGAATTACGT
TAAGCATGTAATAATTAACATGTAATGCATGACGTTATTTATGAGATGGGTTTTTATGATTAGAGTCCCGCAATTAT
ACATTTAATACGCGATAGAAAACAAAATATAGCGCGCAAACCTAGGATAAATTTATCGCGCGGGTGTCTATGTT
ACTAGATCTCTAGAGTCTCAAGCTTGGCGCGCC