SEQUENCE LISTING

<110> Mount Sinai School of Medicine

<120> INFLUENZA VIRUS VACCINES AND USES THEREOF

<130> 6923-204-228

<140>
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<150> 61/536,924
<151> 2011-09-20

<150> 61/565,899
<151> 2011-12-01

<150> 61/607,526
<151> 2012-03-06

<150> 61/648,525
<151> 2012-05-17

<150> 61/670,108
<151> 2012-07-10

<150> 61/684,481
<151> 2012-08-17

<160> 582

<170> FastSEQ for Windows Version 4.0

<210> 1
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<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H1

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Ala Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr
            20   25   30
Val Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn
        35   40   45
Leu Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Gly Ile
    50   55   60
Ala Pro Leu Gln Leu Gly Lys Cys Asn Ile Ala Gly Trp Leu Leu Gly
65   70   75   80
Asn Pro Glu Cys Asp Pro Leu Leu Pro Val Arg Ser Trp Ser Tyr Ile
                85   90   95
Val Glu Thr Pro Asn Ser Glu Asn Gly Ile Cys Tyr Pro Gly Asp Phe
            100   105   110
Ile Asp Tyr Glu Glu Leu Arg Glu Gln Leu Ser Ser Val Ser Ser Phe
        115   120   125
Glu Arg Phe Glu Ile Phe Pro Lys Glu Ser Ser Trp Pro Asn His Asn
    130   135   140
Thr Asn Gly Val Thr Ala Ala Cys Ser His Glu Gly Lys Ser Ser Phe
145   150   155   160

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Tyr Arg Asn Leu Leu Trp Leu Thr Glu Lys Glu Gly Ser Tyr Pro Lys
                165                 170                 175
Leu Lys Asn Ser Tyr Val Asn Lys Lys Gly Lys Glu Val Leu Val Leu
            180                 185                 190
Trp Gly Ile His His Pro Pro Asn Ser Lys Glu Gln Gln Asn Leu Tyr
        195                 200                 205
Gln Asn Glu Asn Ala Tyr Val Ser Val Val Thr Ser Asn Tyr Asn Arg
    210                 215                 220
Arg Phe Thr Pro Glu Ile Ala Glu Arg Pro Lys Val Arg Asp Gln Ala
225                 230                 235                 240
Gly Arg Met Asn Tyr Tyr Trp Thr Leu Leu Lys Pro Gly Asp Thr Ile
                245                 250                 255
Ile Phe Glu Ala Asn Gly Asn Leu Ile Ala Pro Met Tyr Ala Phe Ala
            260                 265                 270
Leu Ser Arg Gly Phe Gly Ser Gly Ile Ile Thr Ser Asn Ala Ser Met
        275                 280                 285
His Glu Cys Asn Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Ser
    290                 295                 300
Ser Leu Pro Tyr Gln Asn Ile His Pro Val Thr Ile Gly Glu Cys Pro
305                 310                 315                 320
Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn
                325                 330                 335
Asn Pro Ser Ile Gln Ser Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe
            340                 345                 350
Ile Glu Gly Gly Trp Thr Gly Met Ile Asp Gly Trp Tyr Gly Tyr His
        355                 360                 365
His Gln Asn Glu Gln Gly Ser Gly Tyr Ala Ala Asp Gln Lys Ser Thr
    370                 375                 380
Gln Asn Ala Ile Asn Gly Ile Thr Asn Lys Val Asn Thr Val Ile Glu
385                 390                 395                 400
Lys Met Asn Ile Gln Phe Thr Ala Val Gly Lys Glu Phe Asn Lys Leu
                405                 410                 415
Glu Lys Arg Met Glu Asn Leu Asn Lys Lys Val Asp Asp Gly Phe Leu
            420                 425                 430
Asp Ile Trp Thr Tyr Asn Ala Glu Leu Leu Val Leu Leu Glu Asn Glu
        435                 440                 445
Arg Thr Leu Asp Phe His Asp Ser Asn Val Lys Asn Leu Tyr Glu Lys
    450                 455                 460
Val Lys Ser Gln Leu Lys Asn Asn Ala Lys Glu Ile Gly Asn Gly Cys
465                 470                 475                 480
Phe Glu Phe Tyr His Lys Cys Asp Asn Glu Cys Met Glu Ser Val Arg
                485                 490                 495
Asn Gly Thr Tyr Asp Tyr Pro Lys Tyr Ser Glu Glu Ser Lys Leu Asn
            500                 505                 510
Arg Glu Lys Val Asp Gly Val Lys Leu Glu Ser Met Gly Ile Tyr Gln
        515                 520                 525
Ile Leu Ala Ile Tyr Ser Thr Val Ala Ser Ser Leu Val Leu Leu Val
    530                 535                 540
Ser Leu Gly Ala Ile Ser Phe Trp Met Cys Ser Asn Gly Ser Leu Gln
545                 550                 555                 560
Cys Arg Ile Cys Ile
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<211> 562
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<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H2

<400> 2

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 1               5                  10                  15
Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val Asp
            20                  25                  30
Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile Leu
        35                  40                  45
Glu Lys Thr His Asn Gly Lys Leu Cys Lys Leu Asn Gly Ile Pro Pro
    50                  55                  60
Leu Glu Leu Gly Asp Cys Ser Ile Ala Gly Trp Leu Leu Gly Asn Pro
65                  70                  75                  80
Glu Cys Asp Arg Leu Leu Thr Val Pro Glu Trp Ser Tyr Ile Met Glu
                85                  90                  95
Lys Glu Asn Pro Arg Asn Gly Leu Cys Tyr Pro Gly Ser Phe Asn Asp
            100                 105                 110
Tyr Glu Glu Leu Lys His Leu Leu Ser Ser Val Thr His Phe Glu Lys
        115                 120                 125
Val Lys Ile Leu Pro Lys Asp Arg Trp Thr Gln His Thr Thr Thr Gly
    130                 135                 140
Gly Ser Arg Ala Cys Ala Val Ser Gly Asn Pro Ser Phe Phe Arg Asn
145                 150                 155                 160
Met Val Trp Leu Thr Lys Lys Gly Ser Asn Tyr Pro Ile Ala Lys Gly
                165                 170                 175
Ser Tyr Asn Asn Thr Ser Gly Glu Gln Met Leu Ile Ile Trp Gly Val
            180                 185                 190
His His Pro Asn Asp Glu Thr Glu Gln Arg Thr Leu Tyr Gln Asn Val
        195                 200                 205
Gly Thr Tyr Val Ser Ile Gly Thr Ser Thr Leu Asn Lys Arg Ser Ile
    210                 215                 220
Pro Val Ile Ala Thr Arg Pro Lys Val Asn Gly Gln Gly Gly Arg Met
225                 230                 235                 240
Glu Phe Ser Trp Thr Ile Leu Asp Ile Trp Asp Thr Ile Asn Phe Glu
                245                 250                 255
Ser Thr Gly Asn Leu Ile Ala Pro Glu Tyr Gly Phe Arg Ile Ser Lys
            260                 265                 270
Arg Gly Ser Ser Gly Ile Met Lys Thr Glu Gly Thr Leu Glu Asn Cys
        275                 280                 285
Glu Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Thr Thr Leu Pro
    290                 295                 300
Phe His Asn Val His Pro Leu Thr Ile Gly Glu Cys Pro Lys Tyr Val
305                 310                 315                 320
Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln
                325                 330                 335
Ile Glu Ser Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly
            340                 345                 350
Gly Trp Gln Gly Met Ile Asp Gly Trp Tyr Gly Tyr His His Ser Asn
        355                 360                 365
Asp Gln Gly Ser Gly Tyr Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala
    370                 375                 380
Ile Asp Gly Ile Thr Asn Arg Val Asn Ser Val Ile Glu Lys Met Asn
385                 390                 395                 400
Thr Gln Phe Glu Ala Val Gly Lys Glu Phe Ser Asn Leu Glu Lys Arg
                405                 410                 415
Leu Glu Asn Leu Asn Lys Lys Met Glu Asp Gly Phe Leu Asp Val Trp
            420                 425                 430
Thr Tyr Asn Ala Glu Leu Leu Val Leu Met Glu Asn Glu Arg Thr Leu
        435                 440                 445
Asp Phe His Asp Ser Asn Val Lys Asn Leu Tyr Asp Arg Val Arg Met
    450                 455                 460
Gln Leu Arg Asp Asn Ala Lys Glu Leu Gly Asn Gly Cys Phe Glu Phe
465                 470                 475                 480
Tyr His Lys Cys Asp Asp Glu Cys Met Asn Ser Val Lys Asn Gly Thr
                485                 490                 495
Tyr Asp Tyr Pro Lys Tyr Glu Glu Glu Ser Lys Leu Asn Arg Asn Glu
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            500                 505                 510
Ile Lys Gly Val Lys Leu Ser Asn Met Gly Val Tyr Gln Ile Leu Ala
        515                 520                 525
Ile Tyr Ala Thr Val Ala Gly Ser Leu Ser Leu Ala Ile Met Ile Ala
    530                 535                 540
Gly Ile Ser Leu Trp Met Cys Ser Asn Gly Ser Leu Gln Cys Arg Ile
545                 550                 555                 560
Cys Ile
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<210> 3
<211> 566
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H3

<400> 3

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 1               5                  10                  15
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
            20                  25                  30
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
        35                  40                  45
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
    50                  55                  60
Gly Lys Ile Cys Asn Asn Pro His Arg Ile Leu Asp Gly Ile Asp Cys
65                  70                  75                  80
Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro His Cys Asp Val Phe Gln
                85                  90                  95
Asn Glu Thr Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Phe Ser Asn
            100                 105                 110
Cys Tyr Pro Tyr Asp Val Pro Asp Tyr Ala Ser Leu Arg Ser Leu Val
        115                 120                 125
Ala Ser Ser Gly Thr Leu Glu Phe Ile Thr Glu Gly Phe Thr Trp Thr
    130                 135                 140
Gly Val Thr Gln Asn Gly Gly Ser Asn Ala Cys Lys Arg Gly Pro Gly
145                 150                 155                 160
Asn Gly Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Thr
                165                 170                 175
Tyr Pro Val Leu Asn Val Thr Met Pro Asn Asn Asp Asn Phe Asp Lys
            180                 185                 190
Leu Tyr Ile Trp Gly Val His His Pro Ser Thr Asn Gln Glu Gln Thr
        195                 200                 205
Ser Leu Tyr Val Gln Glu Ser Gly Arg Val Thr Val Ser Thr Arg Arg
    210                 215                 220
Ser Gln Gln Ser Ile Ile Pro Asn Ile Gly Ser Arg Pro Trp Val Arg
225                 230                 235                 240
Gly Gln Ser Ser Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly
                245                 250                 255
Asp Val Leu Val Ile Asn Ser Asn Gly Asn Leu Ile Ala Pro Arg Gly
            260                 265                 270
Tyr Phe Lys Met Arg Thr Gly Lys Ser Ser Ile Met Ser Ser Asp Ala
        275                 280                 285
Pro Ile Asp Thr Cys Ile Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile
    290                 295                 300
Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Ile Thr Tyr Gly Ala
305                 310                 315                 320
Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met
                325                 330                 335
Arg Asn Val Pro Glu Lys Gln Thr Arg Gly Leu Phe Gly Ala Ile Ala
```

```
            340                 345                 350
Gly Phe Ile Glu Asn Gly Trp Glu Gly Met Ile Asp Gly Trp Tyr Gly
        355                 360                 365
Phe Arg His Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys
    370                 375                 380
Ser Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val
385                 390                 395                 400
Ile Glu Lys Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser
                405                 410                 415
Glu Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr
            420                 425                 430
Lys Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu
        435                 440                 445
Asn Gln His Thr Ile Asp Leu Thr Asp Ser Glu Met Asn Lys Leu Phe
    450                 455                 460
Glu Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Asn
465                 470                 475                 480
Gly Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Glu Ser
                485                 490                 495
Ile Arg Asn Gly Thr Tyr Asp His Asp Val Tyr Arg Asp Glu Ala Leu
            500                 505                 510
Asn Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys
        515                 520                 525
Asp Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Leu Cys
    530                 535                 540
Val Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Arg Gly Asn Ile
545                 550                 555                 560
Arg Cys Asn Ile Cys Ile
                565


<210> 4
<211> 564
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H4

<400> 4
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 1                  5                  10                  15
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
            20                  25                  30
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
        35                  40                  45
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu Cys
    50                  55                  60
Pro Ser Pro Leu Arg Leu Val Asp Gly Gln Thr Cys Asp Ile Ile Asn
65                  70                  75                  80
Gly Ala Leu Gly Ser Pro Gly Cys Asp His Leu Asn Gly Ala Glu Trp
                85                  90                  95
Asp Val Phe Ile Glu Arg Pro Asn Ala Val Asp Thr Cys Tyr Pro Phe
            100                 105                 110
Asp Val Pro Glu Tyr Gln Ser Leu Arg Ser Ile Leu Ala Asn Asn Gly
        115                 120                 125
Lys Phe Glu Phe Ile Ala Glu Glu Phe Gln Trp Asn Thr Val Lys Gln
    130                 135                 140
Asn Gly Lys Ser Gly Ala Cys Lys Arg Ala Asn Val Asp Asp Phe Phe
145                 150                 155                 160
Asn Arg Leu Asn Trp Leu Val Lys Ser Asp Gly Asn Ala Tyr Pro Leu
                165                 170                 175
Gln Asn Leu Thr Lys Ile Asn Asn Gly Asp Tyr Ala Arg Leu Tyr Ile
```

```
            180                 185                 190
Trp Gly Val His His Pro Ser Thr Ser Thr Glu Gln Thr Asn Leu Tyr
        195                 200                 205
Lys Asn Asn Pro Gly Arg Val Thr Val Ser Thr Lys Thr Ser Gln Thr
    210                 215                 220
Ser Val Val Pro Asp Ile Gly Ser Arg Pro Leu Val Arg Gly Gln Ser
225                 230                 235                 240
Gly Arg Val Ser Phe Tyr Trp Thr Ile Val Glu Pro Gly Asp Leu Ile
                245                 250                 255
Val Phe Asn Thr Ile Gly Asn Leu Ile Ala Pro Arg Gly His Tyr Lys
            260                 265                 270
Leu Asn Asn Gln Lys Lys Ser Thr Ile Leu Asn Thr Ala Ile Pro Ile
        275                 280                 285
Gly Ser Cys Val Ser Lys Cys His Thr Asp Lys Gly Ser Leu Ser Thr
    290                 295                 300
Thr Lys Pro Phe Gln Asn Ile Ser Arg Ile Ala Val Gly Asp Cys Pro
305                 310                 315                 320
Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn
                325                 330                 335
Ile Pro Glu Lys Ala Ser Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe
            340                 345                 350
Ile Glu Asn Gly Trp Gln Gly Leu Ile Asp Gly Trp Tyr Gly Phe Arg
        355                 360                 365
His Gln Asn Ala Glu Gly Thr Gly Thr Ala Ala Asp Leu Lys Ser Thr
    370                 375                 380
Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Leu Ile Glu
385                 390                 395                 400
Lys Thr Asn Asp Lys Tyr His Gln Ile Glu Lys Glu Phe Glu Gln Val
                405                 410                 415
Glu Gly Arg Ile Gln Asp Leu Glu Asn Tyr Val Glu Asp Thr Lys Ile
            420                 425                 430
Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn Gln
        435                 440                 445
His Thr Ile Asp Val Thr Asp Ser Glu Met Asn Lys Leu Phe Glu Arg
    450                 455                 460
Val Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Lys Gly Asn Gly Cys
465                 470                 475                 480
Phe Glu Ile Phe His Lys Cys Asp Asn Asn Cys Ile Glu Ser Ile Arg
                485                 490                 495
Asn Gly Thr Tyr Asp His Asp Ile Tyr Arg Asp Glu Ala Ile Asn Asn
            500                 505                 510
Arg Phe Gln Ile Gln Gly Val Lys Leu Thr Gln Gly Tyr Lys Asp Ile
        515                 520                 525
Ile Leu Trp Ile Ser Phe Ser Ile Ser Cys Phe Leu Leu Val Ala Leu
    530                 535                 540
Leu Leu Ala Phe Ile Leu Trp Ala Cys Gln Asn Gly Asn Ile Arg Cys
545                 550                 555                 560
Gln Ile Cys Ile
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<210> 5
<211> 564
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H5

<400> 5

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Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
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            20                  25                  30
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
        35                  40                  45
Leu Glu Arg Thr His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Lys
    50                  55                  60
Pro Leu Ile Leu Arg Asp Cys Ser Val Ala Gly Trp Leu Leu Gly Asn
65                  70                  75                  80
Pro Met Cys Asp Glu Phe Leu Asn Leu Pro Glu Trp Leu Tyr Ile Val
                85                  90                  95
Glu Lys Asp Asn Pro Ile Asn Ser Leu Cys Tyr Pro Gly Asp Phe Asn
            100                 105                 110
Asp Tyr Glu Glu Leu Lys Tyr Leu Leu Ser Ser Thr Asn His Phe Glu
        115                 120                 125
Lys Ile Arg Ile Ile Pro Arg Ser Ser Trp Ser Asn His Asp Ala Ser
    130                 135                 140
Ser Gly Val Ser Ser Ala Cys Pro Tyr Ile Gly Arg Ser Ser Phe Leu
145                 150                 155                 160
Arg Asn Val Val Trp Leu Ile Lys Lys Asn Asn Thr Tyr Pro Thr Ile
                165                 170                 175
Lys Arg Ser Tyr Asn Asn Thr Asn Gln Glu Asp Leu Leu Ile Leu Trp
            180                 185                 190
Gly Ile His His Pro Asn Asp Ala Ala Glu Gln Thr Lys Leu Tyr Gln
        195                 200                 205
Asn Pro Thr Thr Tyr Val Ser Val Gly Thr Ser Thr Leu Asn Gln Arg
    210                 215                 220
Ser Ile Pro Glu Ile Ala Thr Arg Pro Lys Val Asn Gly Gln Ser Gly
225                 230                 235                 240
Arg Met Glu Phe Phe Trp Thr Ile Leu Lys Pro Asn Asp Ala Ile Asn
                245                 250                 255
Phe Glu Ser Asn Gly Asn Phe Ile Ala Pro Arg Tyr Ala Tyr Lys Ile
            260                 265                 270
Val Lys Lys Gly Asp Ser Ala Ile Met Lys Ser Gly Leu Ala Tyr Gly
        275                 280                 285
Asn Cys Asp Thr Lys Cys Gln Thr Pro Val Gly Glu Ile Asn Ser Ser
    290                 295                 300
Met Pro Phe His Asn Ile His Pro His Thr Ile Gly Glu Cys Pro Lys
305                 310                 315                 320
Tyr Val Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val
                325                 330                 335
Pro Gln Arg Lys Lys Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile
            340                 345                 350
Glu Gly Gly Trp Gln Gly Met Val Asp Gly Trp Tyr Gly Tyr His His
        355                 360                 365
Ser Asn Glu Gln Gly Ser Gly Tyr Ala Ala Asp Lys Glu Ser Thr Gln
    370                 375                 380
Lys Ala Ile Asp Gly Ile Thr Asn Lys Val Asn Ser Ile Ile Asp Lys
385                 390                 395                 400
Met Asn Thr Arg Phe Glu Ala Val Gly Lys Glu Phe Asn Asn Leu Glu
                405                 410                 415
Arg Arg Val Glu Asn Leu Asn Lys Lys Met Glu Asp Gly Phe Leu Asp
            420                 425                 430
Val Trp Thr Tyr Asn Val Glu Leu Leu Val Leu Met Glu Asn Glu Arg
        435                 440                 445
Thr Leu Asp Phe His Asp Ser Asn Val Asn Asn Leu Tyr Asp Lys Val
    450                 455                 460
Arg Leu Gln Leu Lys Asp Asn Ala Arg Glu Leu Gly Asn Gly Cys Phe
465                 470                 475                 480
Glu Phe Tyr His Lys Cys Asp Asn Glu Cys Met Glu Ser Val Arg Asn
                485                 490                 495
Gly Thr Tyr Asp Tyr Pro Gln Tyr Ser Glu Glu Ala Arg Leu Asn Arg
            500                 505                 510
Glu Glu Ile Ser Gly Val Lys Leu Glu Ser Met Gly Val Tyr Gln Ile
        515                 520                 525
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Leu Ser Ile Tyr Ser Thr Val Ala Ser Ser Leu Ala Leu Ala Ile Met
530 535 540
Ile Ala Gly Leu Ser Phe Trp Met Cys Ser Asn Gly Ser Leu Gln Cys
545 550 555 560
Arg Ile Cys Ile

<210> 6
<211> 566
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H6

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Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
20 25 30
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
35 40 45
Leu Glu Asn Gln Lys Glu Glu Arg Phe Cys Lys Ile Leu Lys Lys Ala
50 55 60
Pro Leu Asp Leu Lys Gly Cys Thr Ile Glu Gly Trp Ile Leu Gly Asn
65 70 75 80
Pro Gln Cys Asp Leu Leu Leu Gly Asp Gln Ser Trp Ser Tyr Ile Val
85 90 95
Glu Arg Pro Thr Ala Gln Asn Gly Ile Cys Tyr Pro Gly Val Leu Asn
100 105 110
Glu Val Glu Glu Leu Lys Ala Leu Ile Gly Ser Gly Glu Arg Val Glu
115 120 125
Arg Phe Glu Met Phe Pro Lys Ser Thr Trp Thr Gly Val Asp Thr Ser
130 135 140
Ser Gly Val Thr Arg Ala Cys Pro Tyr Asn Ser Gly Ser Ser Phe Tyr
145 150 155 160
Arg Asn Leu Leu Trp Ile Ile Lys Thr Lys Ser Ala Ala Tyr Ser Val
165 170 175
Ile Lys Gly Ala Tyr Asn Asn Thr Gly Asn Gln Pro Ile Leu Tyr Phe
180 185 190
Trp Gly Val His His Pro Pro Asp Thr Asn Glu Gln Asn Thr Leu Tyr
195 200 205
Gly Ser Gly Asp Arg Tyr Val Arg Met Gly Thr Glu Ser Met Asn Phe
210 215 220
Ala Lys Ser Pro Glu Ile Ala Ala Arg Pro Ala Val Asn Gly Gln Arg
225 230 235 240
Gly Arg Ile Asp Tyr Tyr Trp Ser Ile Leu Lys Pro Gly Glu Thr Leu
245 250 255
Asn Val Glu Ser Asn Gly Asn Leu Ile Ala Pro Trp Tyr Ala Phe Arg
260 265 270
Phe Val Ser Thr Ser Asn Lys Gly Ala Val Phe Lys Ser Asn Leu Pro
275 280 285
Ile Glu Asn Cys Asp Ala Thr Cys Gln Thr Val Ala Gly Val Leu Arg
290 295 300
Thr Asn Lys Thr Phe Gln Asn Val Ser Pro Leu Trp Ile Gly Glu Cys
305 310 315 320
Pro Lys Tyr Val Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg
325 330 335
Asn Val Pro Gln Ile Glu Thr Arg Gly Leu Phe Gly Ala Ile Ala Gly
340 345 350
Phe Ile Glu Gly Gly Trp Thr Gly Met Ile Asp Gly Trp Tyr Gly Tyr
355 360 365

```
His His Glu Asn Ser Gln Gly Ser Gly Tyr Ala Ala Asp Arg Glu Ser
    370                 375                 380
Thr Gln Lys Ala Val Asp Gly Ile Thr Asn Lys Val Asn Ser Ile Ile
385                 390                 395                 400
Asp Lys Met Asn Thr Gln Phe Glu Ala Val Asp His Glu Phe Ser Asn
                405                 410                 415
Leu Glu Arg Arg Ile Asp Asn Leu Asn Lys Arg Met Glu Asp Gly Phe
            420                 425                 430
Leu Asp Val Trp Thr Tyr Asn Ala Glu Leu Leu Val Leu Leu Glu Asn
        435                 440                 445
Glu Arg Thr Leu Asp Leu His Asp Ala Asn Val Lys Asn Leu Tyr Glu
    450                 455                 460
Arg Val Lys Ser Gln Leu Arg Asp Asn Ala Met Ile Leu Gly Asn Gly
465                 470                 475                 480
Cys Phe Glu Phe Trp His Lys Cys Asp Asp Glu Cys Met Glu Ser Val
                485                 490                 495
Lys Asn Gly Thr Tyr Asp Tyr Pro Lys Tyr Gln Asp Glu Ser Lys Leu
            500                 505                 510
Asn Arg Gln Glu Ile Glu Ser Val Lys Leu Glu Ser Leu Gly Val Tyr
        515                 520                 525
Gln Ile Leu Ala Ile Tyr Ser Thr Val Ser Ser Ser Leu Val Leu Val
    530                 535                 540
Gly Leu Ile Ile Ala Val Gly Leu Trp Met Cys Ser Asn Gly Ser Met
545                 550                 555                 560
Gln Cys Arg Ile Cys Ile
                565


<210> 7
<211> 563
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H7

<400> 7
Met Asn Thr Gln Ile Leu Val Phe Ala Leu Val Ala Val Ile Pro Thr
 1               5                  10                  15
Asn Ala Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr
            20                  25                  30
Lys Val Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr
        35                  40                  45
Glu Thr Val Glu Arg Thr Asn Ile Pro Lys Ile Cys Ser Lys Gly Lys
    50                  55                  60
Arg Thr Thr Asp Leu Gly Gln Cys Gly Leu Leu Gly Thr Ile Thr Gly
65                  70                  75                  80
Pro Pro Gln Cys Asp Gln Phe Leu Glu Phe Ser Ala Asp Leu Ile Ile
                85                  90                  95
Glu Arg Arg Glu Gly Asn Asp Val Cys Tyr Pro Gly Lys Phe Val Asn
            100                 105                 110
Glu Glu Ala Leu Arg Gln Ile Leu Arg Gly Ser Gly Gly Ile Asp Lys
        115                 120                 125
Glu Thr Met Gly Phe Thr Tyr Ser Gly Ile Arg Thr Asn Gly Thr Thr
    130                 135                 140
Ser Ala Cys Arg Arg Ser Gly Ser Ser Phe Tyr Ala Glu Met Glu Trp
145                 150                 155                 160
Leu Leu Ser Asn Thr Asp Asn Ala Ser Phe Pro Gln Met Thr Lys Ser
                165                 170                 175
Tyr Lys Asn Thr Arg Arg Glu Ser Ala Leu Ile Val Trp Gly Ile His
            180                 185                 190
His Ser Gly Ser Thr Thr Glu Gln Thr Lys Leu Tyr Gly Ser Gly Asn
        195                 200                 205
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Lys Leu Ile Thr Val Gly Ser Ser Lys Tyr His Gln Ser Phe Val Pro
    210                 215                 220
Ser Pro Gly Thr Arg Pro Gln Ile Asn Gly Gln Ser Gly Arg Ile Asp
225                 230                 235                 240
Phe His Trp Leu Ile Leu Asp Pro Asn Asp Thr Val Thr Phe Ser Phe
                245                 250                 255
Asn Gly Ala Phe Ile Ala Pro Asn Arg Ala Ser Phe Leu Arg Gly Lys
            260                 265                 270
Ser Met Gly Ile Gln Ser Asp Val Gln Val Asp Ala Asn Cys Glu Gly
        275                 280                 285
Glu Cys Tyr His Ser Gly Gly Thr Ile Thr Ser Arg Leu Pro Phe Gln
    290                 295                 300
Asn Ile Asn Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val Lys Gln
305                 310                 315                 320
Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn Val Pro Glu Pro Ser
                325                 330                 335
Lys Lys Arg Lys Lys Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile
            340                 345                 350
Glu Asn Gly Trp Glu Gly Leu Val Asp Gly Trp Tyr Gly Phe Arg His
        355                 360                 365
Gln Asn Ala Gln Gly Glu Gly Thr Ala Ala Asp Tyr Lys Ser Thr Gln
    370                 375                 380
Ser Ala Ile Asp Gln Ile Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys
385                 390                 395                 400
Thr Asn Gln Gln Phe Glu Leu Ile Asp Asn Glu Phe Thr Glu Val Glu
                405                 410                 415
Lys Gln Ile Gly Asn Leu Ile Asn Trp Thr Lys Asp Ser Ile Thr Glu
            420                 425                 430
Val Trp Ser Tyr Asn Ala Glu Leu Ile Val Ala Met Glu Asn Gln His
        435                 440                 445
Thr Ile Asp Leu Ala Asp Ser Glu Met Asn Arg Leu Tyr Glu Arg Val
    450                 455                 460
Arg Lys Gln Leu Arg Glu Asn Ala Glu Glu Asp Gly Thr Gly Cys Phe
465                 470                 475                 480
Glu Ile Phe His Lys Cys Asp Asp Asp Cys Met Ala Ser Ile Arg Asn
                485                 490                 495
Asn Thr Tyr Asp His Ser Lys Tyr Arg Glu Glu Ala Met Gln Asn Arg
            500                 505                 510
Ile Gln Ile Asp Pro Val Lys Leu Ser Ser Gly Tyr Lys Asp Val Ile
        515                 520                 525
Leu Trp Phe Ser Phe Gly Ala Ser Cys Phe Leu Leu Leu Ala Ile Ala
    530                 535                 540
Met Gly Leu Val Phe Ile Cys Val Lys Asn Gly Asn Met Arg Cys Thr
545                 550                 555                 560
Ile Cys Ile
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<210> 8
<211> 565
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H8

<400> 8

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Met Glu Lys Phe Ile Ala Ile Ala Thr Leu Ala Ser Thr Asn Ala Tyr
 1               5                  10                  15
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
            20                  25                  30
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
        35                  40                  45
```

```
Val Glu Thr Glu Lys His Pro Ala Tyr Cys Asn Thr Asp Leu Gly Ala
    50                  55                  60
Pro Leu Glu Leu Arg Asp Cys Lys Ile Glu Ala Val Ile Tyr Gly Asn
65                  70                  75                  80
Pro Lys Cys Asp Ile His Leu Lys Asp Gln Gly Trp Ser Tyr Ile Val
                85                  90                  95
Glu Arg Pro Ser Ala Pro Glu Gly Met Cys Tyr Pro Gly Ser Val Glu
            100                 105                 110
Asn Leu Glu Glu Leu Arg Phe Val Phe Ser Ser Ala Ala Ser Tyr Lys
        115                 120                 125
Arg Ile Arg Leu Phe Asp Tyr Ser Arg Trp Asn Val Thr Arg Ser Gly
    130                 135                 140
Thr Ser Lys Ala Cys Asn Ala Ser Thr Gly Gly Gln Ser Phe Tyr Arg
145                 150                 155                 160
Ser Ile Asn Trp Leu Thr Lys Lys Glu Pro Asp Thr Tyr Asp Phe Asn
                165                 170                 175
Glu Gly Ala Tyr Val Asn Asn Glu Asp Gly Asp Ile Ile Phe Leu Trp
            180                 185                 190
Gly Ile His His Pro Pro Asp Thr Lys Glu Gln Thr Thr Leu Tyr Lys
        195                 200                 205
Asn Ala Asn Thr Leu Ser Ser Val Thr Thr Asn Thr Ile Asn Arg Ser
    210                 215                 220
Phe Gln Pro Asn Ile Gly Pro Arg Pro Leu Val Arg Gly Gln Gln Gly
225                 230                 235                 240
Arg Met Asp Tyr Tyr Trp Gly Ile Leu Lys Arg Gly Glu Thr Leu Lys
                245                 250                 255
Ile Arg Thr Asn Gly Asn Leu Ile Ala Pro Glu Phe Gly Tyr Leu Leu
            260                 265                 270
Lys Gly Glu Ser Tyr Gly Arg Ile Ile Gln Asn Glu Asp Ile Pro Ile
        275                 280                 285
Gly Asn Cys Asn Thr Lys Cys Gln Thr Tyr Ala Gly Ala Ile Asn Ser
    290                 295                 300
Ser Lys Pro Phe Gln Asn Ala Ser Arg His Tyr Met Gly Glu Cys Pro
305                 310                 315                 320
Lys Tyr Val Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn
                325                 330                 335
Thr Pro Ser Val Glu Pro Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe
            340                 345                 350
Ile Glu Gly Gly Trp Ser Gly Met Ile Asp Gly Trp Tyr Gly Phe His
        355                 360                 365
His Ser Asn Ser Glu Gly Thr Gly Met Ala Ala Asp Gln Lys Ser Thr
    370                 375                 380
Gln Glu Ala Ile Asp Lys Ile Thr Asn Lys Val Asn Asn Ile Val Asp
385                 390                 395                 400
Lys Met Asn Arg Glu Phe Glu Val Val Asn His Glu Phe Ser Glu Val
                405                 410                 415
Glu Lys Arg Ile Asn Met Ile Asn Asp Lys Ile Asp Asp Gln Ile Glu
            420                 425                 430
Asp Leu Trp Ala Tyr Asn Ala Glu Leu Leu Val Leu Leu Glu Asn Gln
        435                 440                 445
Lys Thr Leu Asp Glu His Asp Ser Asn Val Lys Asn Leu Phe Asp Glu
    450                 455                 460
Val Lys Arg Arg Leu Ser Ala Asn Ala Ile Asp Ala Gly Asn Gly Cys
465                 470                 475                 480
Phe Asp Ile Leu His Lys Cys Asp Asn Glu Cys Met Glu Thr Ile Lys
                485                 490                 495
Asn Gly Thr Tyr Asp His Lys Glu Tyr Glu Glu Glu Ala Lys Leu Glu
            500                 505                 510
Arg Ser Lys Ile Asn Gly Val Lys Leu Glu Glu Asn Thr Thr Tyr Lys
        515                 520                 525
Ile Leu Ser Ile Tyr Ser Thr Val Ala Ala Ser Leu Cys Leu Ala Ile
    530                 535                 540
Leu Ile Ala Gly Gly Leu Ile Leu Gly Met Gln Asn Gly Ser Cys Arg
```

545 550 555 560
Cys Met Phe Cys Ile
565

<210> 9
<211> 560
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H9

<400> 9
Met Glu Thr Lys Ala Ile Ile Ala Ala Leu Leu Met Val Thr Ala Ala
1 5 10 15
Asn Ala Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu
20 25 30
Thr Val Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys
35 40 45
Glu Leu Leu His Thr Glu His Asn Gly Met Leu Cys Ala Thr Asp Leu
50 55 60
Gly His Pro Leu Ile Leu Asp Thr Cys Thr Ile Glu Gly Leu Ile Tyr
65 70 75 80
Gly Asn Pro Ser Cys Asp Ile Leu Leu Gly Gly Lys Glu Trp Ser Tyr
85 90 95
Ile Val Glu Arg Ser Ser Ala Val Asn Gly Met Cys Tyr Pro Gly Asn
100 105 110
Val Glu Asn Leu Glu Glu Leu Arg Ser Leu Phe Ser Ser Ala Lys Ser
115 120 125
Tyr Lys Arg Ile Gln Ile Phe Pro Asp Lys Thr Trp Asn Val Thr Tyr
130 135 140
Ser Gly Thr Ser Arg Ala Cys Ser Asn Ser Phe Tyr Arg Ser Met Arg
145 150 155 160
Trp Leu Thr His Lys Ser Asn Ser Tyr Pro Phe Gln Asn Ala His Tyr
165 170 175
Thr Asn Asn Glu Arg Glu Asn Ile Leu Phe Met Trp Gly Ile His His
180 185 190
Pro Pro Thr Asp Thr Glu Gln Thr Asp Leu Tyr Lys Asn Ala Asp Thr
195 200 205
Thr Thr Ser Val Thr Thr Glu Asp Ile Asn Arg Thr Phe Lys Pro Val
210 215 220
Ile Gly Pro Arg Pro Leu Val Asn Gly Gln Gln Gly Arg Ile Asp Tyr
225 230 235 240
Tyr Trp Ser Val Leu Lys Pro Gly Gln Thr Leu Arg Ile Arg Ser Asn
245 250 255
Gly Asn Leu Ile Ala Pro Trp Tyr Gly His Val Leu Thr Gly Glu Ser
260 265 270
His Gly Arg Ile Leu Lys Thr Asp Leu Asn Asn Gly Asn Cys Val Val
275 280 285
Gln Cys Gln Thr Glu Lys Gly Gly Leu Asn Thr Thr Leu Pro Phe His
290 295 300
Asn Ile Ser Lys Tyr Ala Phe Gly Asn Cys Pro Lys Tyr Val Gly Val
305 310 315 320
Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn Val Pro Ala Val Ser
325 330 335
Ser Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp
340 345 350
Pro Gly Leu Val Ala Gly Trp Tyr Gly Phe Gln His Ser Asn Asp Gln
355 360 365
Gly Val Gly Met Ala Ala Asp Lys Gly Ser Thr Gln Lys Ala Ile Asp
370 375 380
Lys Ile Thr Ser Lys Val Asn Asn Ile Ile Asp Lys Met Asn Lys Gln

385 390 395 400
Tyr Glu Val Ile Asp His Glu Phe Asn Glu Leu Glu Ala Arg Leu Asn
405 410 415
Met Ile Asn Asn Lys Ile Asp Asp Gln Ile Gln Asp Ile Trp Ala Tyr
420 425 430
Asn Ala Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu
435 440 445
His Asp Ala Asn Val Asn Asn Leu Tyr Asn Lys Val Lys Arg Ala Leu
450 455 460
Gly Ser Asn Ala Val Glu Asp Gly Asn Gly Cys Phe Glu Leu Tyr His
465 470 475 480
Lys Cys Asp Asp Gln Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asp
485 490 495
Arg Gln Lys Tyr Gln Glu Glu Ser Arg Leu Glu Arg Gln Lys Ile Glu
500 505 510
Gly Val Lys Leu Glu Ser Glu Gly Thr Tyr Lys Ile Leu Thr Ile Tyr
515 520 525
Ser Thr Val Ala Ser Ser Leu Val Leu Ala Met Gly Phe Ala Ala Phe
530 535 540
Leu Phe Trp Ala Met Ser Asn Gly Ser Cys Arg Cys Asn Ile Cys Ile
545 550 555 560

<210> 10
<211> 561
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H10

<400> 10
Met Tyr Lys Val Val Val Ile Ile Ala Leu Leu Gly Ala Val Lys Gly
1 5 10 15
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
20 25 30
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
35 40 45
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu Cys Met Lys Gly Arg Ser
50 55 60
Tyr Lys Asp Leu Gly Asn Cys His Pro Val Gly Met Leu Ile Gly Thr
65 70 75 80
Pro Val Cys Asp Pro His Leu Thr Gly Thr Trp Asp Thr Leu Ile Glu
85 90 95
Arg Glu Asn Ala Ile Ala His Cys Tyr Pro Gly Ala Thr Ile Asn Glu
100 105 110
Glu Ala Leu Arg Gln Lys Ile Met Glu Ser Gly Gly Ile Ser Lys Met
115 120 125
Ser Thr Gly Phe Thr Tyr Gly Ser Ser Ile Thr Ser Ala Gly Thr Thr
130 135 140
Lys Ala Cys Met Arg Asn Gly Gly Asp Ser Phe Tyr Ala Glu Leu Lys
145 150 155 160
Trp Leu Val Ser Lys Thr Lys Gly Gln Asn Phe Pro Gln Thr Thr Asn
165 170 175
Thr Tyr Arg Asn Thr Asp Thr Ala Glu His Leu Ile Ile Trp Gly Ile
180 185 190
His His Pro Ser Ser Thr Gln Glu Lys Asn Asp Leu Tyr Gly Thr Gln
195 200 205
Ser Leu Ser Ile Ser Val Glu Ser Ser Thr Tyr Gln Asn Asn Phe Val
210 215 220
Pro Val Val Gly Ala Arg Pro Gln Val Asn Gly Gln Ser Gly Arg Ile
225 230 235 240
Asp Phe His Trp Thr Leu Val Gln Pro Gly Asp Asn Ile Thr Phe Ser

```
                245                 250                 255
Asp Asn Gly Gly Leu Ile Ala Pro Ser Arg Val Ser Lys Leu Thr Gly
            260                 265                 270
Arg Asp Leu Gly Ile Gln Ser Glu Ala Leu Ile Asp Asn Ser Cys Glu
        275                 280                 285
Ser Lys Cys Phe Trp Arg Gly Gly Ser Ile Asn Thr Lys Leu Pro Phe
    290                 295                 300
Gln Asn Leu Ser Pro Arg Thr Val Gly Gln Cys Pro Lys Tyr Val Asn
305                 310                 315                 320
Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn Val Pro Glu Val
                325                 330                 335
Val Gln Gly Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn
            340                 345                 350
Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe Arg His Gln Asn
        355                 360                 365
Ala Gln Gly Thr Gly Gln Ala Ala Asp Tyr Lys Ser Thr Gln Ala Ala
    370                 375                 380
Ile Asp Gln Ile Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn
385                 390                 395                 400
Thr Glu Phe Glu Ser Ile Glu Ser Glu Phe Ser Glu Thr Glu His Gln
                405                 410                 415
Ile Gly Asn Val Ile Asn Trp Thr Lys Asp Ser Ile Thr Asp Ile Trp
            420                 425                 430
Thr Tyr Asn Ala Glu Leu Leu Val Ala Met Glu Asn Gln His Thr Ile
        435                 440                 445
Asp Met Ala Asp Ser Glu Met Leu Asn Leu Tyr Glu Arg Val Arg Lys
    450                 455                 460
Gln Leu Arg Gln Asn Ala Glu Glu Asp Gly Lys Gly Cys Phe Glu Ile
465                 470                 475                 480
Tyr His Thr Cys Asp Asp Ser Cys Met Glu Ser Ile Arg Asn Asn Thr
                485                 490                 495
Tyr Asp His Ser Gln Tyr Arg Glu Glu Ala Leu Leu Asn Arg Leu Asn
            500                 505                 510
Ile Asn Pro Val Lys Leu Ser Ser Gly Tyr Lys Asp Ile Ile Leu Trp
        515                 520                 525
Phe Ser Phe Gly Glu Ser Cys Phe Val Leu Leu Ala Val Val Met Gly
    530                 535                 540
Leu Val Phe Phe Cys Leu Lys Asn Gly Asn Met Arg Cys Thr Ile Cys
545                 550                 555                 560
Ile
```

<210> 11
<211> 565
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H11

<400> 11

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Met Glu Lys Thr Leu Leu Phe Ala Ala Ile Phe Leu Cys Val Lys Ala
 1               5                  10                  15
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
            20                  25                  30
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
        35                  40                  45
Val Glu Thr Glu His Thr Gly Ser Phe Cys Ser Ile Asn Gly Lys Gln
    50                  55                  60
Pro Ile Ser Leu Gly Asp Cys Ser Phe Ala Gly Trp Ile Leu Gly Asn
65                  70                  75                  80
Pro Met Cys Asp Glu Leu Ile Gly Lys Thr Ser Trp Ser Tyr Ile Val
```

```
                85                  90                  95
Glu Lys Pro Asn Pro Thr Asn Gly Ile Cys Tyr Pro Gly Thr Leu Glu
            100                 105                 110
Ser Glu Glu Glu Leu Arg Leu Lys Phe Ser Gly Val Leu Glu Phe Asn
        115                 120                 125
Lys Phe Glu Val Phe Thr Ser Asn Gly Trp Gly Ala Val Asn Ser Gly
    130                 135                 140
Val Gly Val Thr Ala Ala Cys Lys Phe Gly Gly Ser Asn Ser Phe Phe
145                 150                 155                 160
Arg Asn Met Val Trp Leu Ile His Gln Ser Gly Thr Tyr Pro Val Ile
                165                 170                 175
Lys Arg Thr Phe Asn Asn Thr Lys Gly Arg Asp Val Leu Ile Val Trp
            180                 185                 190
Gly Ile His His Pro Ala Thr Leu Thr Glu His Gln Asp Leu Tyr Lys
        195                 200                 205
Lys Asp Ser Ser Tyr Val Ala Val Gly Ser Glu Thr Tyr Asn Arg Arg
    210                 215                 220
Phe Thr Pro Glu Ile Asn Thr Arg Pro Arg Val Asn Gly Gln Ala Gly
225                 230                 235                 240
Arg Met Thr Phe Tyr Trp Lys Ile Val Lys Pro Gly Glu Ser Ile Thr
                245                 250                 255
Phe Glu Ser Asn Gly Ala Phe Leu Ala Pro Arg Tyr Ala Phe Glu Ile
            260                 265                 270
Val Ser Val Gly Asn Gly Lys Leu Phe Arg Ser Glu Leu Asn Ile Glu
        275                 280                 285
Ser Cys Ser Thr Lys Cys Gln Thr Glu Ile Gly Gly Ile Asn Thr Asn
    290                 295                 300
Lys Ser Phe His Asn Val His Arg Asn Thr Ile Gly Asp Cys Pro Lys
305                 310                 315                 320
Tyr Val Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn Val
                325                 330                 335
Pro Ala Ile Ala Ser Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile
            340                 345                 350
Glu Gly Gly Trp Pro Gly Leu Ile Asn Gly Trp Tyr Gly Phe Gln His
        355                 360                 365
Arg Asp Glu Glu Gly Thr Gly Ile Ala Ala Asp Lys Glu Ser Thr Gln
    370                 375                 380
Lys Ala Ile Asp Gln Ile Thr Ser Lys Val Asn Asn Ile Val Asp Arg
385                 390                 395                 400
Met Asn Thr Asn Phe Glu Ser Val Gln His Glu Phe Ser Glu Ile Glu
                405                 410                 415
Glu Arg Ile Asn Gln Leu Ser Lys His Val Asp Asp Ser Val Val Asp
            420                 425                 430
Ile Trp Ser Tyr Asn Ala Gln Leu Leu Val Leu Leu Glu Asn Glu Lys
        435                 440                 445
Thr Leu Asp Leu His Asp Ser Asn Val Arg Asn Leu His Glu Lys Val
    450                 455                 460
Arg Arg Met Leu Lys Asp Asn Ala Lys Asp Glu Gly Asn Gly Cys Phe
465                 470                 475                 480
Thr Phe Tyr His Lys Cys Asp Asn Lys Cys Ile Glu Arg Val Arg Asn
                485                 490                 495
Gly Thr Tyr Asp His Lys Glu Phe Glu Glu Glu Ser Lys Ile Asn Arg
            500                 505                 510
Gln Glu Ile Glu Gly Val Lys Leu Asp Ser Ser Gly Asn Val Tyr Lys
        515                 520                 525
Ile Leu Ser Ile Tyr Ser Cys Ile Ala Ser Ser Leu Val Leu Ala Ala
    530                 535                 540
Leu Ile Met Gly Phe Met Phe Trp Ala Cys Ser Asn Gly Ser Cys Arg
545                 550                 555                 560
Cys Thr Ile Cys Ile
                565
```

<210> 12
<211> 564
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H12
<400> 12
Met Glu Lys Phe Ile Ile Leu Ser Thr Val Leu Ala Ala Ser Phe Ala
 1   5   10   15
Tyr Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr
            20   25   30
Val Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu
        35   40   45
Leu Val His Arg Gly Ile Asp Pro Ile Leu Cys Gly Thr Glu Leu Gly
    50   55   60
Ser Pro Leu Val Leu Asp Asp Cys Ser Leu Glu Gly Leu Ile Leu Gly
65   70   75   80
Asn Pro Lys Cys Asp Leu Tyr Leu Asn Gly Arg Glu Trp Ser Tyr Ile
                85   90   95
Val Glu Arg Pro Lys Glu Met Glu Gly Val Cys Tyr Pro Gly Ser Ile
            100   105   110
Glu Asn Gln Glu Glu Leu Arg Ser Leu Phe Ser Ser Ile Lys Lys Tyr
        115   120   125
Glu Arg Val Lys Met Phe Asp Phe Thr Lys Trp Asn Val Thr Tyr Thr
    130   135   140
Gly Thr Ser Lys Ala Cys Asn Asn Thr Ser Asn Gln Gly Ser Phe Tyr
145   150   155   160
Arg Ser Met Arg Trp Leu Thr Leu Lys Ser Gly Gln Phe Pro Val Gln
                165   170   175
Thr Asp Glu Tyr Lys Asn Thr Arg Asp Ser Asp Ile Val Phe Thr Trp
            180   185   190
Ala Ile His His Pro Pro Thr Ser Asp Glu Gln Val Lys Leu Tyr Lys
        195   200   205
Asn Pro Asp Thr Leu Ser Ser Val Thr Thr Val Glu Ile Asn Arg Ser
    210   215   220
Phe Lys Pro Asn Ile Gly Pro Arg Pro Leu Val Arg Gly Gln Gln Gly
225   230   235   240
Arg Met Asp Tyr Tyr Trp Ala Val Leu Lys Pro Gly Gln Thr Val Lys
                245   250   255
Ile Gln Thr Asn Gly Asn Leu Ile Ala Pro Glu Tyr Gly His Leu Ile
            260   265   270
Thr Gly Lys Ser His Gly Arg Ile Leu Lys Asn Asn Leu Pro Met Gly
        275   280   285
Gln Cys Val Thr Glu Cys Gln Leu Asn Glu Gly Val Met Asn Thr Ser
    290   295   300
Lys Pro Phe Gln Asn Thr Ser Lys His Tyr Ile Gly Lys Cys Pro Lys
305   310   315   320
Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn Val
                325   330   335
Pro Gln Val Gln Asp Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile
            340   345   350
Glu Gly Gly Trp Pro Gly Leu Val Ala Gly Trp Tyr Gly Phe Gln His
        355   360   365
Gln Asn Ala Glu Gly Thr Gly Ile Ala Ala Asp Arg Asp Ser Thr Gln
    370   375   380
Arg Ala Ile Asp Asn Met Gln Asn Lys Leu Asn Asn Val Ile Asp Lys
385   390   395   400
Met Asn Lys Gln Phe Glu Val Val Asn His Glu Phe Ser Glu Val Glu
                405   410   415
Ser Arg Ile Asn Met Ile Asn Ser Lys Ile Asp Asp Gln Ile Thr Asp
            420   425   430
Ile Trp Ala Tyr Asn Ala Glu Leu Leu Val Leu Leu Glu Asn Gln Lys

```
        435                 440                 445
Thr Leu Asp Glu His Asp Ala Asn Val Arg Asn Leu His Asp Arg Val
    450                 455                 460
Arg Arg Val Leu Arg Glu Asn Ala Ile Asp Thr Gly Asp Gly Cys Phe
465                 470                 475                 480
Glu Ile Leu His Lys Cys Asp Asn Asn Cys Met Asp Thr Ile Arg Asn
                485                 490                 495
Gly Thr Tyr Asn His Lys Glu Tyr Glu Glu Glu Ser Lys Ile Glu Arg
            500                 505                 510
Gln Lys Val Asn Gly Val Lys Leu Glu Glu Asn Ser Thr Tyr Lys Ile
        515                 520                 525
Leu Ser Ile Tyr Ser Ser Val Ala Ser Ser Leu Val Leu Leu Leu Met
    530                 535                 540
Ile Ile Gly Gly Phe Ile Phe Gly Cys Gln Asn Gly Asn Val Arg Cys
545                 550                 555                 560
Thr Phe Cys Ile
```

<210> 13
<211> 566
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H13

<400> 13

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Met Ala Leu Asn Val Ile Ala Thr Leu Thr Leu Ile Ser Val Cys Val
 1                5                  10                  15
His Ala Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu
            20                  25                  30
Arg Val Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile
        35                  40                  45
Asp Leu Ile Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly
    50                  55                  60
Val Ser Pro Val His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val
65                  70                  75                  80
Gly Asn Pro Ala Cys Thr Ser Asn Phe Gly Ile Arg Glu Trp Ser Tyr
                85                  90                  95
Leu Ile Glu Asp Pro Ala Ala Pro His Gly Leu Cys Tyr Pro Gly Glu
            100                 105                 110
Leu Asn Asn Asn Gly Glu Leu Arg His Leu Phe Ser Gly Ile Arg Ser
        115                 120                 125
Phe Ser Arg Thr Glu Leu Ile Pro Pro Thr Ser Trp Gly Glu Val Leu
    130                 135                 140
Asp Gly Thr Thr Ser Ala Cys Arg Asp Asn Thr Gly Thr Asn Ser Phe
145                 150                 155                 160
Tyr Arg Asn Leu Val Trp Phe Ile Lys Lys Asn Thr Arg Tyr Pro Val
                165                 170                 175
Ile Ser Lys Thr Tyr Asn Asn Thr Thr Gly Arg Asp Val Leu Val Leu
            180                 185                 190
Trp Gly Ile His His Pro Val Ser Val Asp Glu Thr Lys Thr Leu Tyr
        195                 200                 205
Val Asn Ser Asp Pro Tyr Thr Leu Val Ser Thr Lys Ser Trp Ser Glu
    210                 215                 220
Lys Tyr Lys Leu Glu Thr Gly Val Arg Pro Gly Tyr Asn Gly Gln Arg
225                 230                 235                 240
Ser Trp Met Lys Ile Tyr Trp Ser Leu Ile His Pro Gly Glu Met Ile
                245                 250                 255
Thr Phe Glu Ser Asn Gly Gly Phe Leu Ala Pro Arg Tyr Gly Tyr Ile
            260                 265                 270
Ile Glu Glu Tyr Gly Lys Gly Arg Ile Phe Gln Ser Arg Ile Arg Met
```

```
        275                 280                 285
Ser Arg Cys Asn Thr Lys Cys Gln Thr Ser Val Gly Gly Ile Asn Thr
    290                 295                 300
Asn Arg Thr Phe Gln Asn Ile Asp Lys Asn Ala Leu Gly Asp Cys Pro
305                 310                 315                 320
Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn
                325                 330                 335
Val Pro Ala Ile Ser Asn Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe
            340                 345                 350
Ile Glu Gly Gly Trp Pro Gly Leu Ile Asn Gly Trp Tyr Gly Phe Gln
        355                 360                 365
His Gln Asn Glu Gln Gly Thr Gly Ile Ala Ala Asp Lys Glu Ser Thr
    370                 375                 380
Gln Lys Ala Ile Asp Gln Ile Thr Thr Lys Ile Asn Asn Ile Ile Asp
385                 390                 395                 400
Lys Met Asn Gly Asn Tyr Asp Ser Ile Arg Gly Glu Phe Asn Gln Val
                405                 410                 415
Glu Lys Arg Ile Asn Met Leu Ala Asp Arg Ile Asp Asp Ala Val Thr
            420                 425                 430
Asp Ile Trp Ser Tyr Asn Ala Lys Leu Leu Val Leu Leu Glu Asn Asp
        435                 440                 445
Lys Thr Leu Asp Met His Asp Ala Asn Val Lys Asn Leu His Glu Gln
    450                 455                 460
Val Arg Arg Glu Leu Lys Asp Asn Ala Ile Asp Glu Gly Asn Gly Cys
465                 470                 475                 480
Phe Glu Leu Leu His Lys Cys Asn Asp Ser Cys Met Glu Thr Ile Arg
                485                 490                 495
Asn Gly Thr Tyr Asp His Thr Glu Tyr Ala Glu Glu Ser Lys Leu Lys
            500                 505                 510
Arg Gln Glu Ile Asp Gly Ile Lys Leu Lys Ser Glu Asp Asn Val Tyr
        515                 520                 525
Lys Ala Leu Ser Ile Tyr Ser Cys Ile Ala Ser Ser Val Val Leu Val
    530                 535                 540
Gly Leu Ile Leu Ser Phe Ile Met Trp Ala Cys Ser Ser Gly Asn Cys
545                 550                 555                 560
Arg Phe Asn Val Cys Ile
                565


<210> 14
<211> 568
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H14

<400> 14
Met Ile Ala Leu Ile Leu Val Ala Leu Ala Leu Ser His Thr Ala Tyr
 1                  5                  10                  15
Ser Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly
            20                  25                  30
His His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn
        35                  40                  45
His Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr
    50                  55                  60
Asp Glu Leu Cys Pro Ser Pro Leu Lys Leu Val Asp Gly Gln Asp Cys
65                  70                  75                  80
His Leu Ile Asn Gly Ala Leu Gly Ser Pro Gly Cys Asp Arg Leu Gln
                85                  90                  95
Asp Thr Thr Trp Asp Val Phe Ile Glu Arg Pro Thr Ala Val Asp Thr
            100                 105                 110
Cys Tyr Pro Phe Asp Val Pro Asp Tyr Gln Ser Leu Arg Ser Ile Leu
```

```
        115                 120                 125
Ala Ser Ser Gly Ser Leu Glu Phe Ile Ala Glu Gln Phe Thr Trp Asn
    130                 135                 140
Gly Val Lys Val Asp Gly Ser Ser Ser Ala Cys Leu Arg Gly Gly Arg
145                 150                 155                 160
Asn Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ala Thr Asn Gly
                165                 170                 175
Asn Tyr Gly Pro Ile Asn Val Thr Lys Glu Asn Thr Gly Ser Tyr Val
            180                 185                 190
Arg Leu Tyr Leu Trp Gly Val His His Pro Ser Ser Asp Asn Glu Gln
        195                 200                 205
Thr Asp Leu Tyr Lys Val Ala Thr Gly Arg Val Thr Val Ser Thr Arg
    210                 215                 220
Ser Asp Gln Ile Ser Ile Val Pro Asn Ile Gly Ser Arg Pro Arg Val
225                 230                 235                 240
Arg Asn Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Leu Val Asn Pro
                245                 250                 255
Gly Asp Ser Ile Ile Phe Asn Ser Ile Gly Asn Leu Ile Ala Pro Arg
            260                 265                 270
Gly His Tyr Lys Ile Ser Lys Ser Thr Lys Ser Thr Val Leu Lys Ser
        275                 280                 285
Asp Lys Arg Ile Gly Ser Cys Thr Ser Pro Cys Leu Thr Asp Lys Gly
    290                 295                 300
Ser Ile Gln Ser Asp Lys Pro Phe Gln Asn Val Ser Arg Ile Ala Ile
305                 310                 315                 320
Gly Asn Cys Pro Lys Tyr Val Lys Gln Gly Ser Leu Met Leu Ala Thr
                325                 330                 335
Gly Met Arg Asn Ile Pro Gly Lys Gln Ala Lys Gly Leu Phe Gly Ala
            340                 345                 350
Ile Ala Gly Phe Ile Glu Asn Gly Trp Gln Gly Leu Ile Asp Gly Trp
        355                 360                 365
Tyr Gly Phe Arg His Gln Asn Ala Glu Gly Thr Gly Thr Ala Ala Asp
    370                 375                 380
Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn
385                 390                 395                 400
Arg Leu Ile Glu Lys Thr Asn Glu Lys Tyr His Gln Ile Glu Lys Glu
                405                 410                 415
Phe Glu Gln Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu
            420                 425                 430
Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala
        435                 440                 445
Leu Glu Asn Gln His Thr Ile Asp Val Thr Asp Ser Glu Met Asn Lys
    450                 455                 460
Leu Phe Glu Arg Val Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Gln
465                 470                 475                 480
Gly Asn Gly Cys Phe Glu Ile Phe His Gln Cys Asp Asn Asn Cys Ile
                485                 490                 495
Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asn Ile Tyr Arg Asp Glu
            500                 505                 510
Ala Ile Asn Asn Arg Ile Lys Ile Asn Pro Val Thr Leu Thr Met Gly
        515                 520                 525
Tyr Lys Asp Ile Ile Leu Trp Ile Ser Phe Ser Met Ser Cys Phe Val
    530                 535                 540
Phe Val Ala Leu Ile Leu Gly Phe Val Leu Trp Ala Cys Gln Asn Gly
545                 550                 555                 560
Asn Ile Arg Cys Gln Ile Cys Ile
                565
```

<210> 15
<211> 570
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H15

<400> 15
Met Asn Thr Gln Ile Ile Val Ile Leu Val Leu Gly Leu Ser Met Val
 1   5   10   15
Lys Ser Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr
            20   25   30
Lys Val Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr
        35   40   45
Glu Thr Val Glu Ile Thr Gly Ile Asp Lys Val Cys Thr Lys Gly Lys
    50   55   60
Lys Ala Val Asp Leu Gly Ser Cys Gly Ile Leu Gly Thr Ile Ile Gly
65   70   75   80
Pro Pro Gln Cys Asp Leu His Leu Glu Phe Lys Ala Asp Leu Ile Ile
                85   90   95
Glu Arg Arg Asn Ser Ser Asp Ile Cys Tyr Pro Gly Arg Phe Thr Asn
            100   105   110
Glu Glu Ala Leu Arg Gln Ile Ile Arg Glu Ser Gly Gly Ile Asp Lys
        115   120   125
Glu Ser Met Gly Phe Arg Tyr Ser Gly Ile Arg Thr Asp Gly Ala Thr
    130   135   140
Ser Ala Cys Lys Arg Thr Val Ser Ser Phe Tyr Ser Glu Met Lys Trp
145   150   155   160
Leu Ser Ser Ser Met Asn Asn Gln Val Phe Pro Gln Leu Asn Gln Thr
                165   170   175
Tyr Arg Asn Thr Arg Lys Glu Pro Ala Leu Ile Val Trp Gly Val His
            180   185   190
His Ser Ser Ser Leu Asp Glu Gln Asn Lys Leu Tyr Gly Thr Gly Asn
        195   200   205
Lys Leu Ile Thr Val Gly Ser Ser Lys Tyr Gln Gln Ser Phe Ser Pro
    210   215   220
Ser Pro Gly Ala Arg Pro Lys Val Asn Gly Gln Ala Gly Arg Ile Asp
225   230   235   240
Phe His Trp Met Leu Leu Asp Pro Gly Asp Thr Val Thr Phe Thr Phe
                245   250   255
Asn Gly Ala Phe Ile Ala Pro Asp Arg Ala Thr Phe Leu Arg Ser Asn
            260   265   270
Ala Pro Ser Gly Ile Glu Tyr Asn Gly Lys Ser Leu Gly Ile Gln Ser
        275   280   285
Asp Ala Gln Ile Asp Glu Ser Cys Glu Gly Glu Cys Phe Tyr Ser Gly
    290   295   300
Gly Thr Ile Asn Ser Pro Leu Pro Phe Gln Asn Ile Asp Ser Arg Ala
305   310   315   320
Val Gly Lys Cys Pro Arg Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala
                325   330   335
Leu Gly Met Lys Asn Val Pro Glu Lys Ile Arg Thr Arg Gly Leu Phe
            340   345   350
Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly Leu Ile Asp
        355   360   365
Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Gln Gly Thr Ala
    370   375   380
Ala Asp Tyr Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile Thr Gly Lys
385   390   395   400
Leu Asn Arg Leu Ile Glu Lys Thr Asn Lys Gln Phe Glu Leu Ile Asp
                405   410   415
Asn Glu Phe Thr Glu Val Glu Gln Gln Ile Gly Asn Val Ile Asn Trp
            420   425   430
Thr Arg Asp Ser Leu Thr Glu Ile Trp Ser Tyr Asn Ala Glu Leu Leu
        435   440   445
Val Ala Met Glu Asn Gln His Thr Ile Asp Leu Ala Asp Ser Glu Met
    450   455   460

```
Asn Lys Leu Tyr Glu Arg Val Arg Arg Gln Leu Arg Glu Asn Ala Glu
465                 470                 475                 480
Glu Asp Gly Thr Gly Cys Phe Glu Ile Phe His Arg Cys Asp Asp Gln
                485                 490                 495
Cys Met Glu Ser Ile Arg Asn Asn Thr Tyr Asn His Thr Glu Tyr Arg
            500                 505                 510
Gln Glu Ala Leu Gln Asn Arg Ile Met Ile Asn Pro Val Lys Leu Ser
        515                 520                 525
Ser Gly Tyr Lys Asp Val Ile Leu Trp Phe Ser Phe Gly Ala Ser Cys
    530                 535                 540
Val Met Leu Leu Ala Ile Ala Met Gly Leu Ile Phe Met Cys Val Lys
545                 550                 555                 560
Asn Gly Asn Leu Arg Cys Thr Ile Cys Ile
                565                 570


<210> 16
<211> 565
<212> PRT
<213> Influenza virus A

<220>
<223> influenza virus A hemagglutinin subtype H16

<400> 16
Met Met Ile Lys Val Leu Tyr Phe Leu Ile Ile Val Leu Gly Arg Tyr
 1               5                  10                  15
Ser Lys Ala Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser
            20                  25                  30
Asp Thr Val Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser
        35                  40                  45
Val Asp Leu Val Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn
    50                  55                  60
Gly Ile Ser Pro Ile His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile
65                  70                  75                  80
Val Gly Asn Pro Ser Cys Ala Thr Asn Ile Asn Ile Arg Glu Trp Ser
                85                  90                  95
Tyr Leu Ile Glu Asp Pro Asn Ala Pro Asn Lys Phe Cys Tyr Pro Gly
            100                 105                 110
Glu Leu Asp Asn Asn Gly Glu Leu Arg His Leu Phe Ser Gly Val Asn
        115                 120                 125
Ser Phe Ser Arg Thr Glu Leu Ile Asn Pro Ser Lys Trp Gly Asn Val
    130                 135                 140
Leu Asp Gly Val Thr Ala Ser Cys Leu Asp Arg Gly Ala Ser Ser Phe
145                 150                 155                 160
Tyr Arg Asn Leu Val Trp Ile Val Lys Lys Asp Glu Lys Tyr Pro Val
                165                 170                 175
Ile Lys Gly Asp Tyr Asn Asn Thr Thr Gly Arg Asp Val Leu Val Leu
            180                 185                 190
Trp Gly Ile His His Pro Asp Thr Glu Thr Thr Ala Thr Asn Leu Tyr
        195                 200                 205
Val Asn Lys Asn Pro Tyr Thr Leu Val Ser Thr Lys Glu Trp Ser Lys
    210                 215                 220
Arg Tyr Glu Leu Glu Ile Gly Thr Arg Ile Gly Asp Gly Gln Arg Ser
225                 230                 235                 240
Trp Met Lys Leu Tyr Trp His Leu Met His Pro Gly Glu Arg Ile Met
                245                 250                 255
Phe Glu Ser Asn Gly Gly Leu Ile Ala Pro Arg Tyr Gly Tyr Ile Ile
            260                 265                 270
Glu Lys Tyr Gly Thr Gly Arg Ile Phe Gln Ser Gly Val Arg Met Ala
        275                 280                 285
Arg Cys Asn Thr Lys Cys Gln Thr Ser Leu Gly Gly Ile Asn Thr Asn
    290                 295                 300
```

```
Lys Thr Phe Gln Asn Ile Glu Arg Asn Ala Leu Gly Asp Cys Pro Lys
305                 310                 315                 320
Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val
                325                 330                 335
Pro Ser Ile Gly Glu Arg Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile
            340                 345                 350
Glu Gly Gly Trp Pro Gly Leu Ile Asn Gly Trp Tyr Gly Phe Gln His
        355                 360                 365
Gln Asn Glu Gln Gly Thr Gly Ile Ala Ala Asp Lys Ala Ser Thr Gln
    370                 375                 380
Lys Ala Ile Asn Glu Ile Thr Thr Lys Ile Asn Asn Ile Ile Glu Lys
385                 390                 395                 400
Met Asn Gly Asn Tyr Asp Ser Ile Arg Gly Glu Phe Asn Gln Val Glu
                405                 410                 415
Lys Arg Ile Asn Met Leu Ala Asp Arg Val Asp Asp Ala Val Thr Asp
            420                 425                 430
Ile Trp Ser Tyr Asn Ala Lys Leu Leu Val Leu Leu Glu Asn Asp Arg
        435                 440                 445
Thr Leu Asp Leu His Asp Ala Asn Val Arg Asn Leu His Asp Gln Val
    450                 455                 460
Lys Arg Ala Leu Lys Ser Asn Ala Ile Asp Glu Gly Asp Gly Cys Phe
465                 470                 475                 480
Asn Leu Leu His Lys Cys Asn Asp Ser Cys Met Glu Thr Ile Arg Asn
                485                 490                 495
Gly Thr Tyr Asn His Glu Asp Tyr Arg Glu Glu Ser Gln Leu Lys Arg
            500                 505                 510
Gln Glu Ile Glu Gly Ile Lys Leu Lys Thr Glu Asp Asn Val Tyr Lys
        515                 520                 525
Val Leu Ser Ile Tyr Ser Cys Ile Ala Ser Ser Ile Val Leu Val Gly
    530                 535                 540
Leu Ile Leu Ala Phe Ile Met Trp Ala Cys Ser Asn Gly Ser Cys Arg
545                 550                 555                 560
Phe Asn Val Cys Ile
                565
```

<210> 17
<211> 342
<212> PRT
<213> Influenza virus B

<220>
<223> influenza B virus hemagglutinin (in Fig. 3)

<400> 17

```
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
 1               5                  10                  15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20                  25                  30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Gln
        35                  40                  45
Thr Arg Gly Lys Leu Cys Pro Asn Cys Leu Asn Cys Thr Asp Leu Asp
    50                  55                  60
Val Ala Leu Gly Arg Pro Lys Cys Met Gly Thr Ile Pro Ser Ala Lys
65                  70                  75                  80
Ala Ser Ile Leu His Glu Val Lys Pro Val Thr Ser Gly Cys Phe Pro
                85                  90                  95
Ile Met His Asp Arg Thr Lys Ile Arg Gln Leu Pro Asn Leu Leu Arg
            100                 105                 110
Gly Tyr Glu Asn Ile Arg Leu Ser Ala Arg Asn Val Thr Asn Ala Glu
        115                 120                 125
Thr Ala Pro Gly Gly Pro Tyr Ile Val Gly Thr Ser Gly Ser Cys Pro
    130                 135                 140
```

```
Asn Val Thr Asn Gly Asn Gly Phe Phe Ala Thr Met Ala Trp Ala Val
145                 150                 155                 160
Pro Lys Asn Lys Thr Ala Thr Asn Pro Leu Thr Val Glu Val Pro Tyr
                165                 170                 175
Ile Cys Thr Lys Gly Glu Asp Gln Ile Thr Val Trp Gly Phe His Ser
            180                 185                 190
Asp Asp Glu Thr Gln Met Val Lys Leu Tyr Gly Asp Ser Lys Pro Gln
        195                 200                 205
Lys Phe Thr Ser Ser Ala Asn Gly Val Thr Thr His Tyr Val Ser Gln
    210                 215                 220
Ile Gly Gly Phe Pro Asn Gln Ala Glu Asp Glu Gly Leu Pro Gln Ser
225                 230                 235                 240
Gly Arg Ile Val Val Asp Tyr Met Val Gln Lys Pro Gly Lys Thr Gly
                245                 250                 255
Thr Ile Ala Tyr Gln Arg Gly Val Leu Leu Pro Gln Lys Val Trp Cys
            260                 265                 270
Ala Ser Gly Arg Ser Lys Val Ile Lys Gly Ser Leu Pro Leu Ile Gly
        275                 280                 285
Glu Ala Asp Cys Leu His Glu Lys Tyr Gly Gly Leu Asn Lys Ser Lys
    290                 295                 300
Pro Tyr Tyr Thr Gly Glu His Ala Lys Ala Ile Gly Asn Cys Pro Ile
305                 310                 315                 320
Trp Val Lys Thr Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr Arg Pro
                325                 330                 335
Pro Ala Lys Leu Leu Lys
            340
```

<210> 18
<211> 17
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H1 signal peptides

<400> 18
```
Met Lys Ala Asn Leu Leu Val Leu Leu Cys Ala Leu Ala Ala Ala Asp
 1               5                  10                  15
Ala
```

<210> 19
<211> 15
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H2 signal peptides

<400> 19
```
Met Ala Ile Ile Tyr Leu Ile Leu Leu Phe Thr Ala Val Arg Gly
 1               5                  10                  15
```

<210> 20
<211> 16
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H3 signal peptides

<400> 20
Met Lys Thr Ile Ile Ala Leu Ser Tyr Ile Phe Cys Leu Ala Leu Gly
 1   5   10   15

<210> 21
<211> 16
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H4 signal peptides

<400> 21
Met Leu Ser Ile Val Ile Leu Phe Leu Leu Ile Ala Glu Asn Ser Ser
 1   5   10   15

<210> 22
<211> 16
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H5 signal peptides

<400> 22
Met Glu Arg Ile Val Leu Leu Leu Ala Ile Val Ser Leu Val Lys Ser
 1   5   10   15

<210> 23
<211> 16
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H6 signal peptides

<400> 23
Met Ile Ala Ile Ile Val Val Ala Ile Leu Ala Thr Ala Gly Arg Ser
 1   5   10   15

<210> 24
<211> 18
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H7 signal peptides

<400> 24
Met Asn Thr Gln Ile Leu Val Phe Ala Leu Val Ala Val Ile Pro Thr
 1   5   10   15
Asn Ala

<210> 25
<211> 16
<212> PRT

<213> Influenza virus A

<220>
<223> influenza A HA subtype H8 signal peptides

<400> 25
Met Glu Lys Phe Ile Ala Ile Ala Thr Leu Ala Ser Thr Asn Ala Tyr
 1   5   10   15

<210> 26
<211> 18
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H9 signal peptides

<400> 26
Met Glu Thr Lys Ala Ile Ile Ala Ala Leu Leu Met Val Thr Ala Ala
 1   5   10   15
Asn Ala

<210> 27
<211> 16
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H10 signal peptides

<400> 27
Met Tyr Lys Val Val Val Ile Ile Ala Leu Leu Gly Ala Val Lys Gly
 1   5   10   15

<210> 28
<211> 16
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H11 signal peptides

<400> 28
Met Glu Lys Thr Leu Leu Phe Ala Ala Ile Phe Leu Cys Val Lys Ala
 1   5   10   15

<210> 29
<211> 17
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H12 signal peptides

<400> 29
Met Glu Lys Phe Ile Ile Leu Ser Thr Val Leu Ala Ala Ser Phe Ala
 1   5   10   15
Tyr

<210> 30
<211> 18
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H13 signal peptides

<400> 30
Met Ala Leu Asn Val Ile Ala Thr Leu Thr Leu Ile Ser Val Cys Val
 1   5   10   15
His Ala

<210> 31
<211> 17
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H14 signal peptides

<400> 31
Met Ile Ala Leu Ile Leu Val Ala Leu Ala Leu Ser His Thr Ala Tyr
 1   5   10   15
Ser

<210> 32
<211> 18
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H15 signal peptides

<400> 32
Met Asn Thr Gln Ile Ile Val Ile Leu Val Leu Gly Leu Ser Met Val
 1   5   10   15
Lys Ser

<210> 33
<211> 19
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H16 signal peptides

<400> 33
Met Met Ile Lys Val Leu Tyr Phe Leu Ile Ile Val Leu Gly Arg Tyr
 1   5   10   15
Ser Lys Ala

<210> 34
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H1 N-terminal stem segment

<400> 34
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys
        35   40

<210> 35
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H2 N-terminal stem segment

<400> 35
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
 1   5   10   15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
            20   25   30
Leu Glu Lys Thr His Asn Gly Lys Leu Cys
        35   40

<210> 36
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H3 N-terminal stem segment

<400> 36
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
 1   5   10   15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
            20   25   30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
        35   40   45
Gly Lys Ile Cys
    50

<210> 37
<211> 48
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H4 N-terminal stem segment

<400> 37
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val

```
 1               5                  10                  15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
            20                  25                  30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu Cys
        35                  40                  45


<210> 38
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H5 N-terminal stem segment

<400> 38
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
 1               5                  10                  15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
            20                  25                  30
Leu Glu Arg Thr His Asn Gly Lys Leu Cys
        35                  40


<210> 39
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H6 N-terminal stem segment

<400> 39
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
 1               5                  10                  15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
            20                  25                  30
Leu Glu Asn Gln Lys Glu Glu Arg Phe Cys
        35                  40


<210> 40
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H7 N-terminal stem segment

<400> 40
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
 1               5                  10                  15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20                  25                  30
Val Glu Arg Thr Asn Ile Pro Lys Ile Cys
        35                  40


<210> 41
<211> 42
<212> PRT
<213> Influenza virus A
```

<220>
<223> influenza A HA subtype H8 N-terminal stem segment

<400> 41
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr Cys
        35   40

<210> 42
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H9 N-terminal stem segment

<400> 42
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
 1   5   10   15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
            20   25   30
Leu His Thr Glu His Asn Gly Met Leu Cys
        35   40

<210> 43
<211> 43
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H10 N-terminal stem segment

<400> 43
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
 1   5   10   15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
            20   25   30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu Cys
        35   40

<210> 44
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H11 N-terminal stem segment

<400> 44
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1   5   10   15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20   25   30
Val Glu Thr Glu His Thr Gly Ser Phe Cys
        35   40

<210> 45
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H12 N-terminal stem segment

<400> 45
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
 1   5   10   15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
            20   25   30
Val His Arg Gly Ile Asp Pro Ile Leu Cys
        35   40

<210> 46
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H13 N-terminal stem segment

<400> 46
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
 1   5   10   15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
            20   25   30
Ile Glu Thr Asn His Thr Gly Thr Tyr Cys
        35   40

<210> 47
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H14 N-terminal stem segment

<400> 47
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
 1   5   10   15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
            20   25   30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
        35   40   45
Glu Leu Cys
    50

<210> 48
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H15 N-terminal stem segment

<400> 48
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val

```
 1               5                  10                  15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20                  25                  30
Val Glu Ile Thr Gly Ile Asp Lys Val Cys
        35                  40
```

<210> 49
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H16 N-terminal stem segment

<400> 49

```
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
 1               5                  10                  15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
            20                  25                  30
Val Glu Thr Asn His Thr Gly Thr Tyr Cys
        35                  40
```

<210> 50
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H1 C-terminal stem segment

<400> 50

```
Cys Asn Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Ser Ser Leu
 1               5                  10                  15
Pro Tyr Gln Asn Ile His Pro Val Thr Ile Gly Glu Cys Pro Lys Tyr
            20                  25                  30
Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn Pro
        35                  40                  45
Ser Ile Gln Ser Arg
    50
```

<210> 51
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H2 C-terminal stem segment

<400> 51

```
Cys Glu Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Thr Thr Leu
 1               5                  10                  15
Pro Phe His Asn Val His Pro Leu Thr Ile Gly Glu Cys Pro Lys Tyr
            20                  25                  30
Val Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro
        35                  40                  45
Gln Ile Glu Ser Arg
    50
```

<210> 52

<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H3 C-terminal stem segment

<400> 52
Cys Ile Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Pro Asn Asp Lys
 1   5   10   15
Pro Phe Gln Asn Val Asn Lys Ile Thr Tyr Gly Ala Cys Pro Lys Tyr
            20   25   30
Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg Asn Val Pro
        35   40   45
Glu Lys Gln Thr Arg
    50

<210> 53
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H4 C-terminal stem segment

<400> 53
Cys Val Ser Lys Cys His Thr Asp Lys Gly Ser Leu Ser Thr Thr Lys
 1   5   10   15
Pro Phe Gln Asn Ile Ser Arg Ile Ala Val Gly Asp Cys Pro Arg Tyr
            20   25   30
Val Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn Ile Pro
        35   40   45
Glu Lys Ala Ser Arg
    50

<210> 54
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H5 C-terminal stem segment

<400> 54
Cys Asp Thr Lys Cys Gln Thr Pro Val Gly Glu Ile Asn Ser Ser Met
 1   5   10   15
Pro Phe His Asn Ile His Pro His Thr Ile Gly Glu Cys Pro Lys Tyr
            20   25   30
Val Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro
        35   40   45
Gln Arg Lys Lys Arg
    50

<210> 55
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H6 C-terminal stem segment

<400> 55
Cys Asp Ala Thr Cys Gln Thr Val Ala Gly Val Leu Arg Thr Asn Lys
 1   5   10   15
Thr Phe Gln Asn Val Ser Pro Leu Trp Ile Gly Glu Cys Pro Lys Tyr
            20   25   30
Val Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg Asn Val Pro
        35   40   45
Gln Ile Glu Thr Arg
    50

<210> 56
<211> 57
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H7 C-terminal stem segment

<400> 56
Cys Glu Gly Glu Cys Tyr His Ser Gly Gly Thr Ile Thr Ser Arg Leu
 1   5   10   15
Pro Phe Gln Asn Ile Asn Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr
            20   25   30
Val Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn Val Pro
        35   40   45
Glu Pro Ser Lys Lys Arg Lys Lys Arg
    50   55

<210> 57
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H8 C-terminal stem segment

<400> 57
Cys Asn Thr Lys Cys Gln Thr Tyr Ala Gly Ala Ile Asn Ser Ser Lys
 1   5   10   15
Pro Phe Gln Asn Ala Ser Arg His Tyr Met Gly Glu Cys Pro Lys Tyr
            20   25   30
Val Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn Thr Pro
        35   40   45
Ser Val Glu Pro Arg
    50

<210> 58
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H9 C-terminal stem segment

<400> 58
Cys Val Val Gln Cys Gln Thr Glu Lys Gly Gly Leu Asn Thr Thr Leu
 1   5   10   15
Pro Phe His Asn Ile Ser Lys Tyr Ala Phe Gly Asn Cys Pro Lys Tyr
            20   25   30

Val Gly Val Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn Val Pro
        35   40   45
Ala Val Ser Ser Arg
    50

<210> 59
<211> 54
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H10 C-terminal stem segment

<400> 59
Cys Glu Ser Lys Cys Phe Trp Arg Gly Gly Ser Ile Asn Thr Lys Leu
 1   5   10   15
Pro Phe Gln Asn Leu Ser Pro Arg Thr Val Gly Gln Cys Pro Lys Tyr
            20   25   30
Val Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn Val Pro
        35   40   45
Glu Val Val Gln Gly Arg
    50

<210> 60
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H11 C-terminal stem segment

<400> 60
Cys Ser Thr Lys Cys Gln Thr Glu Ile Gly Gly Ile Asn Thr Asn Lys
 1   5   10   15
Ser Phe His Asn Val His Arg Asn Thr Ile Gly Asp Cys Pro Lys Tyr
            20   25   30
Val Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn Val Pro
        35   40   45
Ala Ile Ala Ser Arg
    50

<210> 61
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H12 C-terminal stem segment

<400> 61
Cys Val Thr Glu Cys Gln Leu Asn Glu Gly Val Met Asn Thr Ser Lys
 1   5   10   15
Pro Phe Gln Asn Thr Ser Lys His Tyr Ile Gly Lys Cys Pro Lys Tyr
            20   25   30
Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn Val Pro
        35   40   45
Gln Val Gln Asp Arg
    50

<210> 62
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H13 C-terminal stem segment

<400> 62
Cys Asn Thr Lys Cys Gln Thr Ser Val Gly Gly Ile Asn Thr Asn Arg
 1   5   10   15
Thr Phe Gln Asn Ile Asp Lys Asn Ala Leu Gly Asp Cys Pro Lys Tyr
            20   25   30
Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro
        35   40   45
Ala Ile Ser Asn Arg
    50

<210> 63
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H14 C-terminal stem segment

<400> 63
Cys Thr Ser Pro Cys Leu Thr Asp Lys Gly Ser Ile Gln Ser Asp Lys
 1   5   10   15
Pro Phe Gln Asn Val Ser Arg Ile Ala Ile Gly Asn Cys Pro Lys Tyr
            20   25   30
Val Lys Gln Gly Ser Leu Met Leu Ala Thr Gly Met Arg Asn Ile Pro
        35   40   45
Gly Lys Gln Ala Lys
    50

<210> 64
<211> 54
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H15 C-terminal stem segment

<400> 64
Cys Glu Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro Leu
 1   5   10   15
Pro Phe Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr
            20   25   30
Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val Pro
        35   40   45
Glu Lys Ile Arg Thr Arg
    50

<210> 65
<211> 53
<212> PRT
<213> Influenza virus A

<220>

<223> influenza A HA subtype H16 C-terminal stem segment

<400> 65
Cys Asn Thr Lys Cys Gln Thr Ser Leu Gly Gly Ile Asn Thr Asn Lys
 1   5   10   15
Thr Phe Gln Asn Ile Glu Arg Asn Ala Leu Gly Asp Cys Pro Lys Tyr
            20   25   30
Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro
        35   40   45
Ser Ile Gly Glu Arg
    50

<210> 66
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H1 HA2 domain

<400> 66
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Thr Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Gln Asn Glu Gln Gly Ser
            20   25   30
Gly Tyr Ala Ala Asp Gln Lys Ser Thr Gln Asn Ala Ile Asn Gly Ile
        35   40   45
Thr Asn Lys Val Asn Thr Val Ile Glu Lys Met Asn Ile Gln Phe Thr
    50   55   60
Ala Val Gly Lys Glu Phe Asn Lys Leu Glu Lys Arg Met Glu Asn Leu
65   70   75   80
Asn Lys Lys Val Asp Asp Gly Phe Leu Asp Ile Trp Thr Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100   105   110
Ser Asn Val Lys Asn Leu Tyr Glu Lys Val Lys Ser Gln Leu Lys Asn
        115   120   125
Asn Ala Lys Glu Ile Gly Asn Gly Cys Phe Glu Phe Tyr His Lys Cys
    130   135   140
Asp Asn Glu Cys Met Glu Ser Val Arg Asn Gly Thr Tyr Asp Tyr Pro
145   150   155   160
Lys Tyr Ser Glu Glu Ser Lys Leu Asn Arg Glu Lys Val Asp Gly Val
                165   170   175
Lys Leu Glu Ser Met Gly Ile Tyr Gln Ile Leu Ala Ile Tyr Ser Thr
            180   185   190
Val Ala Ser Ser Leu Val Leu Leu Val Ser Leu Gly Ala Ile Ser Phe
        195   200   205
Trp Met Cys Ser Asn Gly Ser Leu Gln Cys Arg Ile Cys Ile
    210   215   220

<210> 67
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H2 HA2 domain

<400> 67
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1   5   10   15

```
Met Ile Asp Gly Trp Tyr Gly Tyr His His Ser Asn Asp Gln Gly Ser
            20                  25                  30
Gly Tyr Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gly Ile
        35                  40                  45
Thr Asn Arg Val Asn Ser Val Ile Glu Lys Met Asn Thr Gln Phe Glu
    50                  55                  60
Ala Val Gly Lys Glu Phe Ser Asn Leu Glu Lys Arg Leu Glu Asn Leu
65                  70                  75                  80
Asn Lys Lys Met Glu Asp Gly Phe Leu Asp Val Trp Thr Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Leu Met Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100                 105                 110
Ser Asn Val Lys Asn Leu Tyr Asp Arg Val Arg Met Gln Leu Arg Asp
        115                 120                 125
Asn Ala Lys Glu Leu Gly Asn Gly Cys Phe Glu Phe Tyr His Lys Cys
    130                 135                 140
Asp Asp Glu Cys Met Asn Ser Val Lys Asn Gly Thr Tyr Asp Tyr Pro
145                 150                 155                 160
Lys Tyr Glu Glu Glu Ser Lys Leu Asn Arg Asn Glu Ile Lys Gly Val
                165                 170                 175
Lys Leu Ser Asn Met Gly Val Tyr Gln Ile Leu Ala Ile Tyr Ala Thr
            180                 185                 190
Val Ala Gly Ser Leu Ser Leu Ala Ile Met Ile Ala Gly Ile Ser Leu
        195                 200                 205
Trp Met Cys Ser Asn Gly Ser Leu Gln Cys Arg Ile Cys Ile
    210                 215                 220


<210> 68
<211> 221
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H3 HA2 domain

<400> 68
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1               5                  10                  15
Met Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ser Glu Gly Thr
            20                  25                  30
Gly Gln Ala Ala Asp Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35                  40                  45
Asn Gly Lys Leu Asn Arg Val Ile Glu Lys Thr Asn Glu Lys Phe His
    50                  55                  60
Gln Ile Glu Lys Glu Phe Ser Glu Val Glu Gly Arg Ile Gln Asp Leu
65                  70                  75                  80
Glu Lys Tyr Val Glu Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Ala Leu Glu Asn Gln His Thr Ile Asp Leu Thr Asp
            100                 105                 110
Ser Glu Met Asn Lys Leu Phe Glu Lys Thr Arg Arg Gln Leu Arg Glu
        115                 120                 125
Asn Ala Glu Asp Met Gly Asn Gly Cys Phe Lys Ile Tyr His Lys Cys
    130                 135                 140
Asp Asn Ala Cys Ile Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asp
145                 150                 155                 160
Val Tyr Arg Asp Glu Ala Leu Asn Asn Arg Phe Gln Ile Lys Gly Val
                165                 170                 175
Glu Leu Lys Ser Gly Tyr Lys Asp Trp Ile Leu Trp Ile Ser Phe Ala
            180                 185                 190
Ile Ser Cys Phe Leu Leu Cys Val Val Leu Leu Gly Phe Ile Met Trp
        195                 200                 205
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Ala Cys Gln Arg Gly Asn Ile Arg Cys Asn Ile Cys Ile
    210   215   220

<210> 69
<211> 221
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H4 HA2 domain

<400> 69
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Gln Gly
 1   5   10   15
Leu Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Glu Gly Thr
            20   25   30
Gly Thr Ala Ala Asp Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35   40   45
Asn Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Asp Lys Tyr His
    50   55   60
Gln Ile Glu Lys Glu Phe Glu Gln Val Glu Gly Arg Ile Gln Asp Leu
65   70   75   80
Glu Asn Tyr Val Glu Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Ala Leu Glu Asn Gln His Thr Ile Asp Val Thr Asp
            100   105   110
Ser Glu Met Asn Lys Leu Phe Glu Arg Val Arg Arg Gln Leu Arg Glu
        115   120   125
Asn Ala Glu Asp Lys Gly Asn Gly Cys Phe Glu Ile Phe His Lys Cys
    130   135   140
Asp Asn Asn Cys Ile Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asp
145   150   155   160
Ile Tyr Arg Asp Glu Ala Ile Asn Asn Arg Phe Gln Ile Gln Gly Val
                165   170   175
Lys Leu Thr Gln Gly Tyr Lys Asp Ile Ile Leu Trp Ile Ser Phe Ser
            180   185   190
Ile Ser Cys Phe Leu Leu Val Ala Leu Leu Leu Ala Phe Ile Leu Trp
        195   200   205
Ala Cys Gln Asn Gly Asn Ile Arg Cys Gln Ile Cys Ile
    210   215   220

<210> 70
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H5 HA2 domain

<400> 70
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1   5   10   15
Met Val Asp Gly Trp Tyr Gly Tyr His His Ser Asn Glu Gln Gly Ser
            20   25   30
Gly Tyr Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gly Ile
        35   40   45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Thr Arg Phe Glu
    50   55   60
Ala Val Gly Lys Glu Phe Asn Asn Leu Glu Arg Arg Val Glu Asn Leu
65   70   75   80
Asn Lys Lys Met Glu Asp Gly Phe Leu Asp Val Trp Thr Tyr Asn Val

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                85                  90                  95
Glu Leu Leu Val Leu Met Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100                 105                 110
Ser Asn Val Asn Asn Leu Tyr Asp Lys Val Arg Leu Gln Leu Lys Asp
        115                 120                 125
Asn Ala Arg Glu Leu Gly Asn Gly Cys Phe Glu Phe Tyr His Lys Cys
    130                 135                 140
Asp Asn Glu Cys Met Glu Ser Val Arg Asn Gly Thr Tyr Asp Tyr Pro
145                 150                 155                 160
Gln Tyr Ser Glu Glu Ala Arg Leu Asn Arg Glu Glu Ile Ser Gly Val
                165                 170                 175
Lys Leu Glu Ser Met Gly Val Tyr Gln Ile Leu Ser Ile Tyr Ser Thr
            180                 185                 190
Val Ala Ser Ser Leu Ala Leu Ala Ile Met Ile Ala Gly Leu Ser Phe
        195                 200                 205
Trp Met Cys Ser Asn Gly Ser Leu Gln Cys Arg Ile Cys Ile
    210                 215                 220


<210> 71
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H6 HA2 domain

<400> 71
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Thr Gly
 1                  5                  10                  15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Glu Asn Ser Gln Gly Ser
            20                  25                  30
Gly Tyr Ala Ala Asp Arg Glu Ser Thr Gln Lys Ala Val Asp Gly Ile
        35                  40                  45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Thr Gln Phe Glu
    50                  55                  60
Ala Val Asp His Glu Phe Ser Asn Leu Glu Arg Arg Ile Asp Asn Leu
65                  70                  75                  80
Asn Lys Arg Met Glu Asp Gly Phe Leu Asp Val Trp Thr Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Leu His Asp
            100                 105                 110
Ala Asn Val Lys Asn Leu Tyr Glu Arg Val Lys Ser Gln Leu Arg Asp
        115                 120                 125
Asn Ala Met Ile Leu Gly Asn Gly Cys Phe Glu Phe Trp His Lys Cys
    130                 135                 140
Asp Asp Glu Cys Met Glu Ser Val Lys Asn Gly Thr Tyr Asp Tyr Pro
145                 150                 155                 160
Lys Tyr Gln Asp Glu Ser Lys Leu Asn Arg Gln Glu Ile Glu Ser Val
                165                 170                 175
Lys Leu Glu Ser Leu Gly Val Tyr Gln Ile Leu Ala Ile Tyr Ser Thr
            180                 185                 190
Val Ser Ser Ser Leu Val Leu Val Gly Leu Ile Ile Ala Val Gly Leu
        195                 200                 205
Trp Met Cys Ser Asn Gly Ser Met Gln Cys Arg Ile Cys Ile
    210                 215                 220


<210> 72
<211> 221
<212> PRT
<213> Influenza virus A
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<220>
<223> influenza A HA subtype H7 HA2 domain

<400> 72
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1   5   10   15
Leu Val Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Glu
            20   25   30
Gly Thr Ala Ala Asp Tyr Lys Ser Thr Gln Ser Ala Ile Asp Gln Ile
        35   40   45
Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Gln Gln Phe Glu
    50   55   60
Leu Ile Asp Asn Glu Phe Thr Glu Val Glu Lys Gln Ile Gly Asn Leu
65   70   75   80
Ile Asn Trp Thr Lys Asp Ser Ile Thr Glu Val Trp Ser Tyr Asn Ala
                85   90   95
Glu Leu Ile Val Ala Met Glu Asn Gln His Thr Ile Asp Leu Ala Asp
            100   105   110
Ser Glu Met Asn Arg Leu Tyr Glu Arg Val Arg Lys Gln Leu Arg Glu
        115   120   125
Asn Ala Glu Glu Asp Gly Thr Gly Cys Phe Glu Ile Phe His Lys Cys
    130   135   140
Asp Asp Asp Cys Met Ala Ser Ile Arg Asn Asn Thr Tyr Asp His Ser
145   150   155   160
Lys Tyr Arg Glu Glu Ala Met Gln Asn Arg Ile Gln Ile Asp Pro Val
                165   170   175
Lys Leu Ser Ser Gly Tyr Lys Asp Val Ile Leu Trp Phe Ser Phe Gly
            180   185   190
Ala Ser Cys Phe Leu Leu Leu Ala Ile Ala Met Gly Leu Val Phe Ile
        195   200   205
Cys Val Lys Asn Gly Asn Met Arg Cys Thr Ile Cys Ile
    210   215   220

<210> 73
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H8 HA2 domain

<400> 73
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Ser Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Phe His His Ser Asn Ser Glu Gly Thr
            20   25   30
Gly Met Ala Ala Asp Gln Lys Ser Thr Gln Glu Ala Ile Asp Lys Ile
        35   40   45
Thr Asn Lys Val Asn Asn Ile Val Asp Lys Met Asn Arg Glu Phe Glu
    50   55   60
Val Val Asn His Glu Phe Ser Glu Val Glu Lys Arg Ile Asn Met Ile
65   70   75   80
Asn Asp Lys Ile Asp Asp Gln Ile Glu Asp Leu Trp Ala Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu His Asp
            100   105   110
Ser Asn Val Lys Asn Leu Phe Asp Glu Val Lys Arg Arg Leu Ser Ala
        115   120   125
Asn Ala Ile Asp Ala Gly Asn Gly Cys Phe Asp Ile Leu His Lys Cys
    130   135   140
Asp Asn Glu Cys Met Glu Thr Ile Lys Asn Gly Thr Tyr Asp His Lys
145   150   155   160

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Glu Tyr Glu Glu Glu Ala Lys Leu Glu Arg Ser Lys Ile Asn Gly Val
                165                 170                 175
Lys Leu Glu Glu Asn Thr Thr Tyr Lys Ile Leu Ser Ile Tyr Ser Thr
            180                 185                 190
Val Ala Ala Ser Leu Cys Leu Ala Ile Leu Ile Ala Gly Gly Leu Ile
        195                 200                 205
Leu Gly Met Gln Asn Gly Ser Cys Arg Cys Met Phe Cys Ile
    210                 215                 220


<210> 74
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H9 HA2 domain

<400> 74
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1               5                  10                  15
Leu Val Ala Gly Trp Tyr Gly Phe Gln His Ser Asn Asp Gln Gly Val
            20                  25                  30
Gly Met Ala Ala Asp Lys Gly Ser Thr Gln Lys Ala Ile Asp Lys Ile
        35                  40                  45
Thr Ser Lys Val Asn Asn Ile Ile Asp Lys Met Asn Lys Gln Tyr Glu
    50                  55                  60
Val Ile Asp His Glu Phe Asn Glu Leu Glu Ala Arg Leu Asn Met Ile
65                  70                  75                  80
Asn Asn Lys Ile Asp Asp Gln Ile Gln Asp Ile Trp Ala Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu His Asp
            100                 105                 110
Ala Asn Val Asn Asn Leu Tyr Asn Lys Val Lys Arg Ala Leu Gly Ser
        115                 120                 125
Asn Ala Val Glu Asp Gly Asn Gly Cys Phe Glu Leu Tyr His Lys Cys
    130                 135                 140
Asp Asp Gln Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asp Arg Gln
145                 150                 155                 160
Lys Tyr Gln Glu Glu Ser Arg Leu Glu Arg Gln Lys Ile Glu Gly Val
                165                 170                 175
Lys Leu Glu Ser Glu Gly Thr Tyr Lys Ile Leu Thr Ile Tyr Ser Thr
            180                 185                 190
Val Ala Ser Ser Leu Val Leu Ala Met Gly Phe Ala Ala Phe Leu Phe
        195                 200                 205
Trp Ala Met Ser Asn Gly Ser Cys Arg Cys Asn Ile Cys Ile
    210                 215                 220


<210> 75
<211> 221
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H10 HA2 domain

<400> 75
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1               5                  10                  15
Met Val Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Thr
            20                  25                  30
Gly Gln Ala Ala Asp Tyr Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
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        35                  40                  45
Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Thr Glu Phe Glu
    50                  55                  60
Ser Ile Glu Ser Glu Phe Ser Glu Thr Glu His Gln Ile Gly Asn Val
65                  70                  75                  80
Ile Asn Trp Thr Lys Asp Ser Ile Thr Asp Ile Trp Thr Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Ala Met Glu Asn Gln His Thr Ile Asp Met Ala Asp
            100                 105                 110
Ser Glu Met Leu Asn Leu Tyr Glu Arg Val Arg Lys Gln Leu Arg Gln
        115                 120                 125
Asn Ala Glu Glu Asp Gly Lys Gly Cys Phe Glu Ile Tyr His Thr Cys
    130                 135                 140
Asp Asp Ser Cys Met Glu Ser Ile Arg Asn Asn Thr Tyr Asp His Ser
145                 150                 155                 160
Gln Tyr Arg Glu Glu Ala Leu Leu Asn Arg Leu Asn Ile Asn Pro Val
                165                 170                 175
Lys Leu Ser Ser Gly Tyr Lys Asp Ile Ile Leu Trp Phe Ser Phe Gly
            180                 185                 190
Glu Ser Cys Phe Val Leu Leu Ala Val Val Met Gly Leu Val Phe Phe
        195                 200                 205
Cys Leu Lys Asn Gly Asn Met Arg Cys Thr Ile Cys Ile
    210                 215                 220


<210> 76
<211> 223
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H11 HA2 domain

<400> 76
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1                  5                  10                  15
Leu Ile Asn Gly Trp Tyr Gly Phe Gln His Arg Asp Glu Glu Gly Thr
            20                  25                  30
Gly Ile Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gln Ile
        35                  40                  45
Thr Ser Lys Val Asn Asn Ile Val Asp Arg Met Asn Thr Asn Phe Glu
    50                  55                  60
Ser Val Gln His Glu Phe Ser Glu Ile Glu Glu Arg Ile Asn Gln Leu
65                  70                  75                  80
Ser Lys His Val Asp Asp Ser Val Val Asp Ile Trp Ser Tyr Asn Ala
                85                  90                  95
Gln Leu Leu Val Leu Leu Glu Asn Glu Lys Thr Leu Asp Leu His Asp
            100                 105                 110
Ser Asn Val Arg Asn Leu His Glu Lys Val Arg Arg Met Leu Lys Asp
        115                 120                 125
Asn Ala Lys Asp Glu Gly Asn Gly Cys Phe Thr Phe Tyr His Lys Cys
    130                 135                 140
Asp Asn Lys Cys Ile Glu Arg Val Arg Asn Gly Thr Tyr Asp His Lys
145                 150                 155                 160
Glu Phe Glu Glu Glu Ser Lys Ile Asn Arg Gln Glu Ile Glu Gly Val
                165                 170                 175
Lys Leu Asp Ser Ser Gly Asn Val Tyr Lys Ile Leu Ser Ile Tyr Ser
            180                 185                 190
Cys Ile Ala Ser Ser Leu Val Leu Ala Ala Leu Ile Met Gly Phe Met
        195                 200                 205
Phe Trp Ala Cys Ser Asn Gly Ser Cys Arg Cys Thr Ile Cys Ile
    210                 215                 220
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<210> 77
<211> 222
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H12 HA2 domain

<400> 77
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Val Ala Gly Trp Tyr Gly Phe Gln His Gln Asn Ala Glu Gly Thr
            20   25   30
Gly Ile Ala Ala Asp Arg Asp Ser Thr Gln Arg Ala Ile Asp Asn Met
        35   40   45
Gln Asn Lys Leu Asn Asn Val Ile Asp Lys Met Asn Lys Gln Phe Glu
    50   55   60
Val Val Asn His Glu Phe Ser Glu Val Glu Ser Arg Ile Asn Met Ile
65   70   75   80
Asn Ser Lys Ile Asp Asp Gln Ile Thr Asp Ile Trp Ala Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu His Asp
            100   105   110
Ala Asn Val Arg Asn Leu His Asp Arg Val Arg Arg Val Leu Arg Glu
        115   120   125
Asn Ala Ile Asp Thr Gly Asp Gly Cys Phe Glu Ile Leu His Lys Cys
    130   135   140
Asp Asn Asn Cys Met Asp Thr Ile Arg Asn Gly Thr Tyr Asn His Lys
145   150   155   160
Glu Tyr Glu Glu Glu Ser Lys Ile Glu Arg Gln Lys Val Asn Gly Val
                165   170   175
Lys Leu Glu Glu Asn Ser Thr Tyr Lys Ile Leu Ser Ile Tyr Ser Ser
            180   185   190
Val Ala Ser Ser Leu Val Leu Leu Leu Met Ile Ile Gly Gly Phe Ile
        195   200   205
Phe Gly Cys Gln Asn Gly Asn Val Arg Cys Thr Phe Cys Ile
    210   215   220

<210> 78
<211> 223
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H13 HA2 domain

<400> 78
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Ile Asn Gly Trp Tyr Gly Phe Gln His Gln Asn Glu Gln Gly Thr
            20   25   30
Gly Ile Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gln Ile
        35   40   45
Thr Thr Lys Ile Asn Asn Ile Ile Asp Lys Met Asn Gly Asn Tyr Asp
    50   55   60
Ser Ile Arg Gly Glu Phe Asn Gln Val Glu Lys Arg Ile Asn Met Leu
65   70   75   80
Ala Asp Arg Ile Asp Asp Ala Val Thr Asp Ile Trp Ser Tyr Asn Ala
                85   90   95
Lys Leu Leu Val Leu Leu Glu Asn Asp Lys Thr Leu Asp Met His Asp
            100   105   110

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Ala Asn Val Lys Asn Leu His Glu Gln Val Arg Arg Glu Leu Lys Asp
        115                 120                 125
Asn Ala Ile Asp Glu Gly Asn Gly Cys Phe Glu Leu Leu His Lys Cys
    130                 135                 140
Asn Asp Ser Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asp His Thr
145                 150                 155                 160
Glu Tyr Ala Glu Glu Ser Lys Leu Lys Arg Gln Glu Ile Asp Gly Ile
                165                 170                 175
Lys Leu Lys Ser Glu Asp Asn Val Tyr Lys Ala Leu Ser Ile Tyr Ser
            180                 185                 190
Cys Ile Ala Ser Ser Val Val Leu Val Gly Leu Ile Leu Ser Phe Ile
        195                 200                 205
Met Trp Ala Cys Ser Ser Gly Asn Cys Arg Phe Asn Val Cys Ile
    210                 215                 220


<210> 79
<211> 221
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H14 HA2 domain

<400> 79
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Gln Gly
 1               5                  10                  15
Leu Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Glu Gly Thr
            20                  25                  30
Gly Thr Ala Ala Asp Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35                  40                  45
Asn Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Glu Lys Tyr His
    50                  55                  60
Gln Ile Glu Lys Glu Phe Glu Gln Val Glu Gly Arg Ile Gln Asp Leu
65                  70                  75                  80
Glu Lys Tyr Val Glu Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Ala Leu Glu Asn Gln His Thr Ile Asp Val Thr Asp
            100                 105                 110
Ser Glu Met Asn Lys Leu Phe Glu Arg Val Arg Arg Gln Leu Arg Glu
        115                 120                 125
Asn Ala Glu Asp Gln Gly Asn Gly Cys Phe Glu Ile Phe His Gln Cys
    130                 135                 140
Asp Asn Asn Cys Ile Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asn
145                 150                 155                 160
Ile Tyr Arg Asp Glu Ala Ile Asn Asn Arg Ile Lys Ile Asn Pro Val
                165                 170                 175
Thr Leu Thr Met Gly Tyr Lys Asp Ile Ile Leu Trp Ile Ser Phe Ser
            180                 185                 190
Met Ser Cys Phe Val Phe Val Ala Leu Ile Leu Gly Phe Val Leu Trp
        195                 200                 205
Ala Cys Gln Asn Gly Asn Ile Arg Cys Gln Ile Cys Ile
    210                 215                 220


<210> 80
<211> 221
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H15 HA2 domain
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<400> 80
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1   5   10   15
Leu Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Gln
            20   25   30
Gly Thr Ala Ala Asp Tyr Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35   40   45
Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Lys Gln Phe Glu
    50   55   60
Leu Ile Asp Asn Glu Phe Thr Glu Val Glu Gln Gln Ile Gly Asn Val
65   70   75   80
Ile Asn Trp Thr Arg Asp Ser Leu Thr Glu Ile Trp Ser Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Ala Met Glu Asn Gln His Thr Ile Asp Leu Ala Asp
            100   105   110
Ser Glu Met Asn Lys Leu Tyr Glu Arg Val Arg Arg Gln Leu Arg Glu
        115   120   125
Asn Ala Glu Glu Asp Gly Thr Gly Cys Phe Glu Ile Phe His Arg Cys
    130   135   140
Asp Asp Gln Cys Met Glu Ser Ile Arg Asn Asn Thr Tyr Asn His Thr
145   150   155   160
Glu Tyr Arg Gln Glu Ala Leu Gln Asn Arg Ile Met Ile Asn Pro Val
                165   170   175
Lys Leu Ser Ser Gly Tyr Lys Asp Val Ile Leu Trp Phe Ser Phe Gly
            180   185   190
Ala Ser Cys Val Met Leu Leu Ala Ile Ala Met Gly Leu Ile Phe Met
        195   200   205
Cys Val Lys Asn Gly Asn Leu Arg Cys Thr Ile Cys Ile
    210   215   220

<210> 81
<211> 223
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA subtype H16 HA2 domain

<400> 81
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Ile Asn Gly Trp Tyr Gly Phe Gln His Gln Asn Glu Gln Gly Thr
            20   25   30
Gly Ile Ala Ala Asp Lys Ala Ser Thr Gln Lys Ala Ile Asn Glu Ile
        35   40   45
Thr Thr Lys Ile Asn Asn Ile Ile Glu Lys Met Asn Gly Asn Tyr Asp
    50   55   60
Ser Ile Arg Gly Glu Phe Asn Gln Val Glu Lys Arg Ile Asn Met Leu
65   70   75   80
Ala Asp Arg Val Asp Asp Ala Val Thr Asp Ile Trp Ser Tyr Asn Ala
                85   90   95
Lys Leu Leu Val Leu Leu Glu Asn Asp Arg Thr Leu Asp Leu His Asp
            100   105   110
Ala Asn Val Arg Asn Leu His Asp Gln Val Lys Arg Ala Leu Lys Ser
        115   120   125
Asn Ala Ile Asp Glu Gly Asp Gly Cys Phe Asn Leu Leu His Lys Cys
    130   135   140
Asn Asp Ser Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asn His Glu
145   150   155   160
Asp Tyr Arg Glu Glu Ser Gln Leu Lys Arg Gln Glu Ile Glu Gly Ile
                165   170   175
Lys Leu Lys Thr Glu Asp Asn Val Tyr Lys Val Leu Ser Ile Tyr Ser

```
            180                 185                 190
Cys Ile Ala Ser Ser Ile Val Leu Val Gly Leu Ile Leu Ala Phe Ile
        195                 200                 205
Met Trp Ala Cys Ser Asn Gly Ser Cys Arg Phe Asn Val Cys Ile
    210                 215                 220


<210> 82
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H1 stem domain

<400> 82
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Thr Gly
 1               5                  10                  15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Gln Asn Glu Gln Gly Ser
            20                  25                  30
Gly Tyr Ala Ala Asp Gln Lys Ser Thr Gln Asn Ala Ile Asn Gly Ile
        35                  40                  45
Thr Asn Lys Val Asn Thr Val Ile Glu Lys Met Asn Ile Gln Phe Thr
    50                  55                  60
Ala Val Gly Lys Glu Phe Asn Lys Leu Glu Lys Arg Met Glu Asn Leu
65                  70                  75                  80
Asn Lys Lys Val Asp Asp Gly Phe Leu Asp Ile Trp Thr Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100                 105                 110
Ser Asn Val Lys Asn Leu Tyr Glu Lys Val Lys Ser Gln Leu Lys Asn
        115                 120                 125
Asn Ala Lys Glu Ile Gly Asn Gly Cys Phe Glu Phe Tyr His Lys Cys
    130                 135                 140
Asp Asn Glu Cys Met Glu Ser Val Arg Asn Gly Thr Tyr Asp Tyr Pro
145                 150                 155                 160
Lys Tyr Ser Glu Glu Ser Lys Leu Asn Arg Glu Lys Val Asp Gly Val
                165                 170                 175
Lys Leu Glu Ser
            180


<210> 83
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H2 stem domain

<400> 83
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1               5                  10                  15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Ser Asn Asp Gln Gly Ser
            20                  25                  30
Gly Tyr Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gly Ile
        35                  40                  45
Thr Asn Arg Val Asn Ser Val Ile Glu Lys Met Asn Thr Gln Phe Glu
    50                  55                  60
Ala Val Gly Lys Glu Phe Ser Asn Leu Glu Lys Arg Leu Glu Asn Leu
65                  70                  75                  80
Asn Lys Lys Met Glu Asp Gly Phe Leu Asp Val Trp Thr Tyr Asn Ala
                85                  90                  95
```

Glu Leu Leu Val Leu Met Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100   105   110
Ser Asn Val Lys Asn Leu Tyr Asp Arg Val Arg Met Gln Leu Arg Asp
        115   120   125
Asn Ala Lys Glu Leu Gly Asn Gly Cys Phe Glu Phe Tyr His Lys Cys
    130   135   140
Asp Asp Glu Cys Met Asn Ser Val Lys Asn Gly Thr Tyr Asp Tyr Pro
145   150   155   160
Lys Tyr Glu Glu Glu Ser Lys Leu Asn Arg Asn Glu Ile Lys Gly Val
                165   170   175
Lys Leu Ser Asn
            180

<210> 84
<211> 179
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H3 stem domain

<400> 84
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ser Glu Gly Thr
            20   25   30
Gly Gln Ala Ala Asp Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35   40   45
Asn Gly Lys Leu Asn Arg Val Ile Glu Lys Thr Asn Glu Lys Phe His
    50   55   60
Gln Ile Glu Lys Glu Phe Ser Glu Val Glu Gly Arg Ile Gln Asp Leu
65   70   75   80
Glu Lys Tyr Val Glu Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Ala Leu Glu Asn Gln His Thr Ile Asp Leu Thr Asp
            100   105   110
Ser Glu Met Asn Lys Leu Phe Glu Lys Thr Arg Arg Gln Leu Arg Glu
        115   120   125
Asn Ala Glu Asp Met Gly Asn Gly Cys Phe Lys Ile Tyr His Lys Cys
    130   135   140
Asp Asn Ala Cys Ile Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asp
145   150   155   160
Val Tyr Arg Asp Glu Ala Leu Asn Asn Arg Phe Gln Ile Lys Gly Val
                165   170   175
Glu Leu Lys

<210> 85
<211> 179
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H4 stem domain

<400> 85
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Gln Gly
 1   5   10   15
Leu Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Glu Gly Thr
            20   25   30
Gly Thr Ala Ala Asp Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile

```
        35                  40                  45
Asn Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Asp Lys Tyr His
    50                  55                  60
Gln Ile Glu Lys Glu Phe Glu Gln Val Glu Gly Arg Ile Gln Asp Leu
65                  70                  75                  80
Glu Asn Tyr Val Glu Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Ala Leu Glu Asn Gln His Thr Ile Asp Val Thr Asp
            100                 105                 110
Ser Glu Met Asn Lys Leu Phe Glu Arg Val Arg Arg Gln Leu Arg Glu
        115                 120                 125
Asn Ala Glu Asp Lys Gly Asn Gly Cys Phe Glu Ile Phe His Lys Cys
    130                 135                 140
Asp Asn Asn Cys Ile Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asp
145                 150                 155                 160
Ile Tyr Arg Asp Glu Ala Ile Asn Asn Arg Phe Gln Ile Gln Gly Val
                165                 170                 175
Lys Leu Thr
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<210> 86
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H5 stem domain

<400> 86

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Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1                  5                  10                  15
Met Val Asp Gly Trp Tyr Gly Tyr His His Ser Asn Glu Gln Gly Ser
            20                  25                  30
Gly Tyr Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gly Ile
        35                  40                  45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Thr Arg Phe Glu
    50                  55                  60
Ala Val Gly Lys Glu Phe Asn Asn Leu Glu Arg Arg Val Glu Asn Leu
65                  70                  75                  80
Asn Lys Lys Met Glu Asp Gly Phe Leu Asp Val Trp Thr Tyr Asn Val
                85                  90                  95
Glu Leu Leu Val Leu Met Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100                 105                 110
Ser Asn Val Asn Asn Leu Tyr Asp Lys Val Arg Leu Gln Leu Lys Asp
        115                 120                 125
Asn Ala Arg Glu Leu Gly Asn Gly Cys Phe Glu Phe Tyr His Lys Cys
    130                 135                 140
Asp Asn Glu Cys Met Glu Ser Val Arg Asn Gly Thr Tyr Asp Tyr Pro
145                 150                 155                 160
Gln Tyr Ser Glu Glu Ala Arg Leu Asn Arg Glu Glu Ile Ser Gly Val
                165                 170                 175
Lys Leu Glu Ser
            180
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<210> 87
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H6 stem domain

<400> 87
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Thr Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Glu Asn Ser Gln Gly Ser
            20   25   30
Gly Tyr Ala Ala Asp Arg Glu Ser Thr Gln Lys Ala Val Asp Gly Ile
        35   40   45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Thr Gln Phe Glu
    50   55   60
Ala Val Asp His Glu Phe Ser Asn Leu Glu Arg Arg Ile Asp Asn Leu
65   70   75   80
Asn Lys Arg Met Glu Asp Gly Phe Leu Asp Val Trp Thr Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Leu His Asp
            100   105   110
Ala Asn Val Lys Asn Leu Tyr Glu Arg Val Lys Ser Gln Leu Arg Asp
        115   120   125
Asn Ala Met Ile Leu Gly Asn Gly Cys Phe Glu Phe Trp His Lys Cys
    130   135   140
Asp Asp Glu Cys Met Glu Ser Val Lys Asn Gly Thr Tyr Asp Tyr Pro
145   150   155   160
Lys Tyr Gln Asp Glu Ser Lys Leu Asn Arg Gln Glu Ile Glu Ser Val
                165   170   175
Lys Leu Glu Ser
            180

<210> 88
<211> 179
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H7 stem domain

<400> 88
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1   5   10   15
Leu Val Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Glu
            20   25   30
Gly Thr Ala Ala Asp Tyr Lys Ser Thr Gln Ser Ala Ile Asp Gln Ile
        35   40   45
Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Gln Gln Phe Glu
    50   55   60
Leu Ile Asp Asn Glu Phe Thr Glu Val Glu Lys Gln Ile Gly Asn Leu
65   70   75   80
Ile Asn Trp Thr Lys Asp Ser Ile Thr Glu Val Trp Ser Tyr Asn Ala
                85   90   95
Glu Leu Ile Val Ala Met Glu Asn Gln His Thr Ile Asp Leu Ala Asp
            100   105   110
Ser Glu Met Asn Arg Leu Tyr Glu Arg Val Arg Lys Gln Leu Arg Glu
        115   120   125
Asn Ala Glu Glu Asp Gly Thr Gly Cys Phe Glu Ile Phe His Lys Cys
    130   135   140
Asp Asp Asp Cys Met Ala Ser Ile Arg Asn Asn Thr Tyr Asp His Ser
145   150   155   160
Lys Tyr Arg Glu Glu Ala Met Gln Asn Arg Ile Gln Ile Asp Pro Val
                165   170   175
Lys Leu Ser

<210> 89
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H8 stem domain

<400> 89
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Ser Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Phe His His Ser Asn Ser Glu Gly Thr
            20   25   30
Gly Met Ala Ala Asp Gln Lys Ser Thr Gln Glu Ala Ile Asp Lys Ile
        35   40   45
Thr Asn Lys Val Asn Asn Ile Val Asp Lys Met Asn Arg Glu Phe Glu
    50   55   60
Val Val Asn His Glu Phe Ser Glu Val Glu Lys Arg Ile Asn Met Ile
65   70   75   80
Asn Asp Lys Ile Asp Asp Gln Ile Glu Asp Leu Trp Ala Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu His Asp
            100   105   110
Ser Asn Val Lys Asn Leu Phe Asp Glu Val Lys Arg Arg Leu Ser Ala
        115   120   125
Asn Ala Ile Asp Ala Gly Asn Gly Cys Phe Asp Ile Leu His Lys Cys
    130   135   140
Asp Asn Glu Cys Met Glu Thr Ile Lys Asn Gly Thr Tyr Asp His Lys
145   150   155   160
Glu Tyr Glu Glu Glu Ala Lys Leu Glu Arg Ser Lys Ile Asn Gly Val
                165   170   175
Lys Leu Glu Glu
            180

<210> 90
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H9 stem domain

<400> 90
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Val Ala Gly Trp Tyr Gly Phe Gln His Ser Asn Asp Gln Gly Val
            20   25   30
Gly Met Ala Ala Asp Lys Gly Ser Thr Gln Lys Ala Ile Asp Lys Ile
        35   40   45
Thr Ser Lys Val Asn Asn Ile Ile Asp Lys Met Asn Lys Gln Tyr Glu
    50   55   60
Val Ile Asp His Glu Phe Asn Glu Leu Glu Ala Arg Leu Asn Met Ile
65   70   75   80
Asn Asn Lys Ile Asp Asp Gln Ile Gln Asp Ile Trp Ala Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu His Asp
            100   105   110
Ala Asn Val Asn Asn Leu Tyr Asn Lys Val Lys Arg Ala Leu Gly Ser
        115   120   125
Asn Ala Val Glu Asp Gly Asn Gly Cys Phe Glu Leu Tyr His Lys Cys
    130   135   140
Asp Asp Gln Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asp Arg Gln

145 150 155 160
Lys Tyr Gln Glu Glu Ser Arg Leu Glu Arg Gln Lys Ile Glu Gly Val
165 170 175
Lys Leu Glu Ser
180

<210> 91
<211> 179
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H10 stem domain

<400> 91
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
1 5 10 15
Met Val Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Thr
20 25 30
Gly Gln Ala Ala Asp Tyr Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
35 40 45
Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Thr Glu Phe Glu
50 55 60
Ser Ile Glu Ser Glu Phe Ser Glu Thr Glu His Gln Ile Gly Asn Val
65 70 75 80
Ile Asn Trp Thr Lys Asp Ser Ile Thr Asp Ile Trp Thr Tyr Asn Ala
85 90 95
Glu Leu Leu Val Ala Met Glu Asn Gln His Thr Ile Asp Met Ala Asp
100 105 110
Ser Glu Met Leu Asn Leu Tyr Glu Arg Val Arg Lys Gln Leu Arg Gln
115 120 125
Asn Ala Glu Glu Asp Gly Lys Gly Cys Phe Glu Ile Tyr His Thr Cys
130 135 140
Asp Asp Ser Cys Met Glu Ser Ile Arg Asn Asn Thr Tyr Asp His Ser
145 150 155 160
Gln Tyr Arg Glu Glu Ala Leu Leu Asn Arg Leu Asn Ile Asn Pro Val
165 170 175
Lys Leu Ser

<210> 92
<211> 181
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H11 stem domain

<400> 92
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
1 5 10 15
Leu Ile Asn Gly Trp Tyr Gly Phe Gln His Arg Asp Glu Glu Gly Thr
20 25 30
Gly Ile Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gln Ile
35 40 45
Thr Ser Lys Val Asn Asn Ile Val Asp Arg Met Asn Thr Asn Phe Glu
50 55 60
Ser Val Gln His Glu Phe Ser Glu Ile Glu Glu Arg Ile Asn Gln Leu
65 70 75 80
Ser Lys His Val Asp Asp Ser Val Val Asp Ile Trp Ser Tyr Asn Ala
85 90 95

Gln Leu Leu Val Leu Leu Glu Asn Glu Lys Thr Leu Asp Leu His Asp
            100   105   110
Ser Asn Val Arg Asn Leu His Glu Lys Val Arg Arg Met Leu Lys Asp
        115   120   125
Asn Ala Lys Asp Glu Gly Asn Gly Cys Phe Thr Phe Tyr His Lys Cys
    130   135   140
Asp Asn Lys Cys Ile Glu Arg Val Arg Asn Gly Thr Tyr Asp His Lys
145   150   155   160
Glu Phe Glu Glu Glu Ser Lys Ile Asn Arg Gln Glu Ile Glu Gly Val
                165   170   175
Lys Leu Asp Ser Ser
            180

<210> 93
<211> 180
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H12 stem domain

<400> 93
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Val Ala Gly Trp Tyr Gly Phe Gln His Gln Asn Ala Glu Gly Thr
            20   25   30
Gly Ile Ala Ala Asp Arg Asp Ser Thr Gln Arg Ala Ile Asp Asn Met
        35   40   45
Gln Asn Lys Leu Asn Asn Val Ile Asp Lys Met Asn Lys Gln Phe Glu
    50   55   60
Val Val Asn His Glu Phe Ser Glu Val Glu Ser Arg Ile Asn Met Ile
65   70   75   80
Asn Ser Lys Ile Asp Asp Gln Ile Thr Asp Ile Trp Ala Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Gln Lys Thr Leu Asp Glu His Asp
            100   105   110
Ala Asn Val Arg Asn Leu His Asp Arg Val Arg Arg Val Leu Arg Glu
        115   120   125
Asn Ala Ile Asp Thr Gly Asp Gly Cys Phe Glu Ile Leu His Lys Cys
    130   135   140
Asp Asn Asn Cys Met Asp Thr Ile Arg Asn Gly Thr Tyr Asn His Lys
145   150   155   160
Glu Tyr Glu Glu Glu Ser Lys Ile Glu Arg Gln Lys Val Asn Gly Val
                165   170   175
Lys Leu Glu Glu
            180

<210> 94
<211> 181
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H13 stem domain

<400> 94
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Ile Asn Gly Trp Tyr Gly Phe Gln His Gln Asn Glu Gln Gly Thr
            20   25   30
Gly Ile Ala Ala Asp Lys Glu Ser Thr Gln Lys Ala Ile Asp Gln Ile

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        35                  40                  45
Thr Thr Lys Ile Asn Asn Ile Ile Asp Lys Met Asn Gly Asn Tyr Asp
    50                  55                  60
Ser Ile Arg Gly Glu Phe Asn Gln Val Glu Lys Arg Ile Asn Met Leu
65                  70                  75                  80
Ala Asp Arg Ile Asp Asp Ala Val Thr Asp Ile Trp Ser Tyr Asn Ala
                85                  90                  95
Lys Leu Leu Val Leu Leu Glu Asn Asp Lys Thr Leu Asp Met His Asp
            100                 105                 110
Ala Asn Val Lys Asn Leu His Glu Gln Val Arg Arg Glu Leu Lys Asp
        115                 120                 125
Asn Ala Ile Asp Glu Gly Asn Gly Cys Phe Glu Leu Leu His Lys Cys
    130                 135                 140
Asn Asp Ser Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asp His Thr
145                 150                 155                 160
Glu Tyr Ala Glu Glu Ser Lys Leu Lys Arg Gln Glu Ile Asp Gly Ile
                165                 170                 175
Lys Leu Lys Ser Glu
            180
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<210> 95
<211> 179
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H14 stem domain

<400> 95

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Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Gln Gly
 1                  5                  10                  15
Leu Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Glu Gly Thr
            20                  25                  30
Gly Thr Ala Ala Asp Leu Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35                  40                  45
Asn Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Glu Lys Tyr His
    50                  55                  60
Gln Ile Glu Lys Glu Phe Glu Gln Val Glu Gly Arg Ile Gln Asp Leu
65                  70                  75                  80
Glu Lys Tyr Val Glu Asp Thr Lys Ile Asp Leu Trp Ser Tyr Asn Ala
                85                  90                  95
Glu Leu Leu Val Ala Leu Glu Asn Gln His Thr Ile Asp Val Thr Asp
            100                 105                 110
Ser Glu Met Asn Lys Leu Phe Glu Arg Val Arg Arg Gln Leu Arg Glu
        115                 120                 125
Asn Ala Glu Asp Gln Gly Asn Gly Cys Phe Glu Ile Phe His Gln Cys
    130                 135                 140
Asp Asn Asn Cys Ile Glu Ser Ile Arg Asn Gly Thr Tyr Asp His Asn
145                 150                 155                 160
Ile Tyr Arg Asp Glu Ala Ile Asn Asn Arg Ile Lys Ile Asn Pro Val
                165                 170                 175
Thr Leu Thr
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<210> 96
<211> 179
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H15 stem domain

<400> 96
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Asn Gly Trp Glu Gly
 1   5   10   15
Leu Ile Asp Gly Trp Tyr Gly Phe Arg His Gln Asn Ala Gln Gly Gln
            20   25   30
Gly Thr Ala Ala Asp Tyr Lys Ser Thr Gln Ala Ala Ile Asp Gln Ile
        35   40   45
Thr Gly Lys Leu Asn Arg Leu Ile Glu Lys Thr Asn Lys Gln Phe Glu
    50   55   60
Leu Ile Asp Asn Glu Phe Thr Glu Val Glu Gln Gln Ile Gly Asn Val
65   70   75   80
Ile Asn Trp Thr Arg Asp Ser Leu Thr Glu Ile Trp Ser Tyr Asn Ala
                85   90   95
Glu Leu Leu Val Ala Met Glu Asn Gln His Thr Ile Asp Leu Ala Asp
            100   105   110
Ser Glu Met Asn Lys Leu Tyr Glu Arg Val Arg Arg Gln Leu Arg Glu
        115   120   125
Asn Ala Glu Glu Asp Gly Thr Gly Cys Phe Glu Ile Phe His Arg Cys
    130   135   140
Asp Asp Gln Cys Met Glu Ser Ile Arg Asn Asn Thr Tyr Asn His Thr
145   150   155   160
Glu Tyr Arg Gln Glu Ala Leu Gln Asn Arg Ile Met Ile Asn Pro Val
                165   170   175
Lys Leu Ser

<210> 97
<211> 181
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H16 stem domain

<400> 97
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Pro Gly
 1   5   10   15
Leu Ile Asn Gly Trp Tyr Gly Phe Gln His Gln Asn Glu Gln Gly Thr
            20   25   30
Gly Ile Ala Ala Asp Lys Ala Ser Thr Gln Lys Ala Ile Asn Glu Ile
        35   40   45
Thr Thr Lys Ile Asn Asn Ile Ile Glu Lys Met Asn Gly Asn Tyr Asp
    50   55   60
Ser Ile Arg Gly Glu Phe Asn Gln Val Glu Lys Arg Ile Asn Met Leu
65   70   75   80
Ala Asp Arg Val Asp Asp Ala Val Thr Asp Ile Trp Ser Tyr Asn Ala
                85   90   95
Lys Leu Leu Val Leu Leu Glu Asn Asp Arg Thr Leu Asp Leu His Asp
            100   105   110
Ala Asn Val Arg Asn Leu His Asp Gln Val Lys Arg Ala Leu Lys Ser
        115   120   125
Asn Ala Ile Asp Glu Gly Asp Gly Cys Phe Asn Leu Leu His Lys Cys
    130   135   140
Asn Asp Ser Cys Met Glu Thr Ile Arg Asn Gly Thr Tyr Asn His Glu
145   150   155   160
Asp Tyr Arg Glu Glu Ser Gln Leu Lys Arg Gln Glu Ile Glu Gly Ile
                165   170   175
Lys Leu Lys Thr Glu
            180

<210> 98
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H1 Luminal domain

<400> 98
Met Gly Ile Tyr Gln
 1   5

<210> 99
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H2 Luminal domain

<400> 99
Met Gly Val Tyr Gln
 1   5

<210> 100
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H3 Luminal domain

<400> 100
Ser Gly Tyr Lys Asp
 1   5

<210> 101
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H4 Luminal domain

<400> 101
Gln Gly Tyr Lys Asp
 1   5

<210> 102
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H5 Luminal domain

<400> 102
Met Gly Val Tyr Gln
 1   5

<210> 103
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H6 Luminal domain

<400> 103
Leu Gly Val Tyr Gln
 1   5

<210> 104
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H7 Luminal domain

<400> 104
Ser Gly Tyr Lys Asp
 1   5

<210> 105
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H8 Luminal domain

<400> 105
Asn Thr Thr Tyr Lys
 1   5

<210> 106
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H9 Luminal domain

<400> 106
Glu Gly Thr Tyr Lys
 1   5

<210> 107
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H10 Luminal domain

<400> 107

Ser Gly Tyr Lys Asp
 1   5

<210> 108
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H11 Luminal domain

<400> 108
Gly Asn Val Tyr Lys
 1   5

<210> 109
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H12 Luminal domain

<400> 109
Asn Ser Thr Tyr Lys
 1   5

<210> 110
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H13 Luminal domain

<400> 110
Asp Asn Val Tyr Lys
 1   5

<210> 111
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H14 Luminal domain

<400> 111
Met Gly Tyr Lys Asp
 1   5

<210> 112
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H15 Luminal domain

<400> 112
Ser Gly Tyr Lys Asp
 1   5

<210> 113
<211> 5
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H16 Luminal domain

<400> 113
Asp Asn Val Tyr Lys
 1   5

<210> 114
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H1 transmembrane domain

<400> 114
Ile Leu Ala Ile Tyr Ser Thr Val Ala Ser Ser Leu Val Leu Leu Val
 1   5   10   15
Ser Leu Gly Ala Ile Ser Phe Trp Met Cys Ser
            20   25

<210> 115
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H2 transmembrane domain

<400> 115
Ile Leu Ala Ile Tyr Ala Thr Val Ala Gly Ser Leu Ser Leu Ala Ile
 1   5   10   15
Met Ile Ala Gly Ile Ser Leu Trp Met Cys Ser
            20   25

<210> 116
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H3 transmembrane domain

<400> 116
Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Leu Cys Val
 1   5   10   15
Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln
            20   25

<210> 117
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H4 transmembrane domain

<400> 117
Ile Ile Leu Trp Ile Ser Phe Ser Ile Ser Cys Phe Leu Leu Val Ala
 1   5   10   15
Leu Leu Leu Ala Phe Ile Leu Trp Ala Cys Gln
            20   25

<210> 118
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H5 transmembrane domain

<400> 118
Ile Leu Ser Ile Tyr Ser Thr Val Ala Ser Ser Leu Ala Leu Ala Ile
 1   5   10   15
Met Ile Ala Gly Leu Ser Phe Trp Met Cys Ser
            20   25

<210> 119
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H6 transmembrane domain

<400> 119
Ile Leu Ala Ile Tyr Ser Thr Val Ser Ser Ser Leu Val Leu Val Gly
 1   5   10   15
Leu Ile Ile Ala Val Gly Leu Trp Met Cys Ser
            20   25

<210> 120
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H7 transmembrane domain

<400> 120
Val Ile Leu Trp Phe Ser Phe Gly Ala Ser Cys Phe Leu Leu Leu Ala
 1   5   10   15
Ile Ala Met Gly Leu Val Phe Ile Cys Val Lys
            20   25

<210> 121
<211> 27

<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H8 transmembrane domain

<400> 121
Ile Leu Ser Ile Tyr Ser Thr Val Ala Ala Ser Leu Cys Leu Ala Ile
 1   5   10   15
Leu Ile Ala Gly Gly Leu Ile Leu Gly Met Gln
            20   25

<210> 122
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H9 transmembrane domain

<400> 122
Ile Leu Thr Ile Tyr Ser Thr Val Ala Ser Ser Leu Val Leu Ala Met
 1   5   10   15
Gly Phe Ala Ala Phe Leu Phe Trp Ala Met Ser
            20   25

<210> 123
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H10 transmembrane domain

<400> 123
Ile Ile Leu Trp Phe Ser Phe Gly Glu Ser Cys Phe Val Leu Leu Ala
 1   5   10   15
Val Val Met Gly Leu Val Phe Phe Cys Leu Lys
            20   25

<210> 124
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H11 transmembrane domain

<400> 124
Ile Leu Ser Ile Tyr Ser Cys Ile Ala Ser Ser Leu Val Leu Ala Ala
 1   5   10   15
Leu Ile Met Gly Phe Met Phe Trp Ala Cys Ser
            20   25

<210> 125
<211> 28
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H12 transmembrane domain

<400> 125
Ile Leu Ser Ile Tyr Ser Ser Val Ala Ser Ser Leu Val Leu Leu Leu
 1   5   10   15
Met Ile Ile Gly Gly Phe Ile Phe Gly Cys Gln Asn
            20   25

<210> 126
<211> 28
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H13 transmembrane domain

<400> 126
Ala Leu Ser Ile Tyr Ser Cys Ile Ala Ser Ser Val Val Leu Val Gly
 1   5   10   15
Leu Ile Leu Ser Phe Ile Met Trp Ala Cys Ser Ser
            20   25

<210> 127
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H14 transmembrane domain

<400> 127
Ile Ile Leu Trp Ile Ser Phe Ser Met Ser Cys Phe Val Phe Val Ala
 1   5   10   15
Leu Ile Leu Gly Phe Val Leu Trp Ala Cys Gln
            20   25

<210> 128
<211> 28
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H15 transmembrane domain

<400> 128
Val Ile Leu Trp Phe Ser Phe Gly Ala Ser Cys Val Met Leu Leu Ala
 1   5   10   15
Ile Ala Met Gly Leu Ile Phe Met Cys Val Lys Asn
            20   25

<210> 129
<211> 27
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H16 transmembrane domain

<400> 129
Val Leu Ser Ile Tyr Ser Cys Ile Ala Ser Ser Ile Val Leu Val Gly
 1   5   10   15
Leu Ile Leu Ala Phe Ile Met Trp Ala Cys Ser
            20   25

<210> 130
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H1 cytoplasmic domain

<400> 130
Asn Gly Ser Leu Gln Cys Arg Ile Cys Ile
 1   5   10

<210> 131
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H2 cytoplasmic domain

<400> 131
Asn Gly Ser Leu Gln Cys Arg Ile Cys Ile
 1   5   10

<210> 132
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H3 cytoplasmic domain

<400> 132
Arg Gly Asn Ile Arg Cys Asn Ile Cys Ile
 1   5   10

<210> 133
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H4 cytoplasmic domain

<400> 133
Asn Gly Asn Ile Arg Cys Gln Ile Cys Ile
 1   5   10

<210> 134
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H5 cytoplasmic domain

<400> 134
Asn Gly Ser Leu Gln Cys Arg Ile Cys Ile
 1   5   10

<210> 135
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H6 cytoplasmic domain

<400> 135
Asn Gly Ser Met Gln Cys Arg Ile Cys Ile
 1   5   10

<210> 136
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H7 cytoplasmic domain

<400> 136
Asn Gly Asn Met Arg Cys Thr Ile Cys Ile
 1   5   10

<210> 137
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H8 cytoplasmic domain

<400> 137
Asn Gly Ser Cys Arg Cys Met Phe Cys Ile
 1   5   10

<210> 138
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H9 cytoplasmic domain

<400> 138
Asn Gly Ser Cys Arg Cys Asn Ile Cys Ile
 1   5   10

<210> 139
<211> 10

<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H10 cytoplasmic domain

<400> 139
Asn Gly Asn Met Arg Cys Thr Ile Cys Ile
 1   5   10

<210> 140
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H11 cytoplasmic domain

<400> 140
Asn Gly Ser Cys Arg Cys Thr Ile Cys Ile
 1   5   10

<210> 141
<211> 9
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H12 cytoplasmic domain

<400> 141
Gly Asn Val Arg Cys Thr Phe Cys Ile
 1   5

<210> 142
<211> 9
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H13 cytoplasmic domain

<400> 142
Gly Asn Cys Arg Phe Asn Val Cys Ile
 1   5

<210> 143
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H14 cytoplasmic domain

<400> 143
Asn Gly Asn Ile Arg Cys Gln Ile Cys Ile
 1   5   10

<210> 144
<211> 9
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H15 cytoplasmic domain

<400> 144
Gly Asn Leu Arg Cys Thr Ile Cys Ile
 1   5

<210> 145
<211> 10
<212> PRT
<213> Influenza virus A

<220>
<223> influenza A HA2 domain subtype H16 cytoplasmic domain

<400> 145
Asn Gly Ser Cys Arg Phe Asn Val Cys Ile
 1   5   10

<210> 146
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of HA1 N-terminal stem segment

<220>
<221> VARIANT
<222> 1
<223> Xaa = Tyr or His

<220>
<221> VARIANT
<222> 2
<223> Xaa = His, Leu or Gln

<220>
<221> VARIANT
<222> 3.....20
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 21
<223> Xaa = any amino acid or absent

<220>
<221> VARIANT
<222> 21
<223> Xaa = any amino acid or absent

<220>
<221> VARIANT
<222> 23
<223> Xaa = His, Ser, Gln, Thr or Asn

<400> 146
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
 1   5   10   15
Xaa Xaa Xaa Xaa Xaa Xaa Xaa
            20

<210> 147
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of HA1 c-terminal stem segment

<220>
<221> VARIANT
<222> 1
<223> Xaa = Thr, Ser, Asn, Asp, Pro or Lys

<220>
<221> VARIANT
<222> 2
<223> Xaa = Leu, Met, Lys or Arg

<400> 147
Xaa Xaa
 1

<210> 148
<211> 4
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of HA2 domain

<220>
<221> VARIANT
<222> 1
<223> Xaa = Val or Ile

<220>
<221> VARIANT
<222> 1
<223> Xaa = Asp, Asn or Ala

<400> 148
Xaa Xaa Gly Trp
 1

<210> 149
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of HA2 domain

<220>

<221> VARIANT
<222> 1
<223> Xaa = Lys, Gln, Arg, Leu or Tyr

<220>
<221> VARIANT
<222> 2, 3, 6, 10, 13, 17
<223> Xaa = any amino acid

<220>
<221> VARIANT
<222> 11
<223> Xaa = Ile, Val or Met

<220>
<221> VARIANT
<222> 12
<223> Xaa = Thr, Gln or Asn

<220>
<221> VARIANT
<222> 15
<223> Xaa = Val or Leu

<220>
<221> VARIANT
<222> 18
<223> Xaa = Val, Ile or Leu

<220>
<221> VARIANT
<222> 19
<223> Xaa = Val or Ile

<400> 149
Xaa Xaa Xaa Thr Gln Xaa Ala Ile Asp Xaa Xaa Xaa Xaa Lys Xaa Asn
 1   5   10   15
Xaa Xaa Xaa

<210> 150
<211> 15
<212> PRT
<213> Influenza virus B

<220>
<223> Signal peptide of Influenza B HA construct variant Arg50-Ser277

<400> 150
Met Lys Ala Ile Ile Val Ile Leu Met Val Val Thr Ser Asn Ala
 1   5   10   15

<210> 151
<211> 15
<212> PRT
<213> Influenza virus B

<220>
<223> Signal peptide of Influenza B HA construct variant Ala66-Trp271

<400> 151

Met Lys Ala Ile Ile Val Ile Leu Met Val Val Thr Ser Asn Ala
 1   5   10   15

<210> 152
<211> 15
<212> PRT
<213> Influenza virus B

<220>
<223> Signal peptide of Influenza B HA construct variant Lys80-Ser277

<400> 152
Met Lys Ala Ile Ile Val Ile Leu Met Val Val Thr Ser Asn Ala
 1   5   10   15

<210> 153
<211> 15
<212> PRT
<213> Influenza virus B

<220>
<223> Signal peptide of Influenza B HA construct variant Arg80-Ser277

<400> 153
Met Lys Ala Ile Ile Val Ile Leu Met Val Val Thr Ser Asn Ala
 1   5   10   15

<210> 154
<211> 50
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct variant Arg50-Ser277

<400> 154
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
 1   5   10   15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20   25   30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Glu
        35   40   45
Thr Arg
    50

<210> 155
<211> 66
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct variant Ala66-Trp271

<400> 155
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
 1   5   10   15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20   25   30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Glu

35 40 45
Thr Arg Gly Lys Leu Cys Pro Lys Cys Leu Asn Cys Thr Asp Leu Asp
50 55 60
Val Ala
65

<210> 156
<211> 80
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct variant Lys80-Ser277

<400> 156
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
1 5 10 15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
20 25 30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Glu
35 40 45
Thr Arg Gly Lys Leu Cys Pro Lys Cys Leu Asn Cys Thr Asp Leu Asp
50 55 60
Val Ala Leu Gly Arg Pro Lys Cys Thr Gly Lys Ile Pro Ser Ala Lys
65 70 75 80

<210> 157
<211> 80
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct variant Arg80-Ser277

<400> 157
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
1 5 10 15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
20 25 30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Glu
35 40 45
Thr Arg Gly Lys Leu Cys Pro Lys Cys Leu Asn Cys Thr Asp Leu Asp
50 55 60
Val Ala Leu Gly Arg Pro Lys Cys Thr Gly Lys Ile Pro Ser Ala Arg
65 70 75 80

<210> 158
<211> 68
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 C-terminal Stem Segment of Influenza B HA construct variant Arg50-Ser277

<400> 158
Ser Lys Val Ile Lys Gly Ser Leu Pro Leu Ile Gly Glu Ala Asp Cys
1 5 10 15

Leu His Glu Lys Tyr Gly Gly Leu Asn Lys Ser Lys Pro Tyr Tyr Thr
            20   25   30
Gly Glu His Ala Lys Ala Ile Gly Asn Cys Pro Ile Trp Val Lys Thr
        35   40   45
Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr Arg Pro Pro Ala Lys Leu
    50   55   60
Leu Lys Glu Arg
65

<210> 159
<211> 74
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 C-terminal Stem Segment of Influenza B HA construct
      variant Ala66-Trp271

<400> 159
Trp Cys Ala Ser Gly Arg Ser Lys Val Ile Lys Gly Ser Leu Pro Leu
 1   5   10   15
Ile Gly Glu Ala Asp Cys Leu His Glu Lys Tyr Gly Gly Leu Asn Lys
            20   25   30
Ser Lys Pro Tyr Tyr Thr Gly Glu His Ala Lys Ala Ile Gly Asn Cys
        35   40   45
Pro Ile Trp Val Lys Thr Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr
    50   55   60
Arg Pro Pro Ala Lys Leu Leu Lys Glu Arg
65   70

<210> 160
<211> 223
<212> PRT
<213> Influenza virus B

<220>
<223> HA2 Domain of Influenza B HA construct variant Arg50-Ser277 and
      other variants listed in Table 3

<400> 160
Gly Phe Phe Gly Ala Ile Ala Gly Phe Leu Glu Gly Gly Trp Glu Gly
 1   5   10   15
Met Ile Ala Gly Trp His Gly Tyr Thr Ser His Gly Ala His Gly Val
            20   25   30
Ala Val Ala Ala Asp Leu Lys Ser Thr Gln Glu Ala Ile Asn Lys Ile
        35   40   45
Thr Lys Asn Leu Asn Ser Leu Ser Glu Leu Glu Val Lys Asn Leu Gln
    50   55   60
Arg Leu Ser Gly Ala Met Asp Glu Leu His Asn Glu Ile Leu Glu Leu
65   70   75   80
Asp Glu Lys Val Asp Asp Leu Arg Ala Asp Thr Ile Ser Ser Gln Ile
                85   90   95
Glu Leu Ala Val Leu Leu Ser Asn Glu Gly Ile Ile Asn Ser Glu Asp
            100   105   110
Glu His Leu Leu Ala Leu Glu Arg Lys Leu Lys Lys Met Leu Gly Pro
        115   120   125
Ser Ala Val Glu Ile Gly Asn Gly Cys Phe Glu Thr Lys His Lys Cys
    130   135   140
Asn Gln Thr Cys Leu Asp Arg Ile Ala Ala Gly Thr Phe Asp Ala Gly
145   150   155   160
Glu Phe Ser Leu Pro Thr Phe Asp Ser Leu Asn Ile Thr Ala Ala Ser

```
                165                 170                 175
Leu Asn Asp Asp Gly Leu Asp Asn His Thr Ile Leu Leu Tyr Tyr Ser
            180                 185                 190
Thr Ala Ala Ser Ser Leu Ala Val Thr Leu Met Ile Ala Ile Phe Val
        195                 200                 205
Val Tyr Met Val Ser Arg Asp Asn Val Ser Cys Ser Ile Cys Leu
    210                 215                 220


<210> 161
<211> 179
<212> PRT
<213> Influenza virus B

<220>
<223> Stem domain of Influenza B HA2 domain subtype HA2

<400> 161
Gly Phe Phe Gly Ala Ile Ala Gly Phe Leu Glu Gly Gly Trp Glu Gly
 1               5                  10                  15
Met Ile Ala Gly Trp His Gly Tyr Thr Ser His Gly Ala His Gly Val
            20                  25                  30
Ala Val Ala Ala Asp Leu Lys Ser Thr Gln Glu Ala Ile Asn Lys Ile
        35                  40                  45
Thr Lys Asn Leu Asn Ser Leu Ser Glu Leu Glu Val Lys Asn Leu Gln
    50                  55                  60
Arg Leu Ser Gly Ala Met Asp Glu Leu His Asn Glu Ile Leu Glu Leu
65                  70                  75                  80
Asp Glu Lys Val Asp Asp Leu Arg Ala Asp Thr Ile Ser Ser Gln Ile
                85                  90                  95
Glu Leu Ala Val Leu Leu Ser Asn Glu Gly Ile Ile Asn Ser Glu Asp
            100                 105                 110
Glu His Leu Leu Ala Leu Glu Arg Lys Leu Lys Lys Met Leu Gly Pro
        115                 120                 125
Ser Ala Val Glu Ile Gly Asn Gly Cys Phe Glu Thr Lys His Lys Cys
    130                 135                 140
Asn Gln Thr Cys Leu Asp Arg Ile Ala Ala Gly Thr Phe Asp Ala Gly
145                 150                 155                 160
Glu Phe Ser Leu Pro Thr Phe Asp Ser Leu Asn Ile Thr Ala Ala Ser
                165                 170                 175
Leu Asn Asp



<210> 162
<211> 5
<212> PRT
<213> Influenza virus B

<220>
<223> luminal domain of Influenza B HA2 domain subtype HA2

<400> 162
Asp Gly Leu Asp Asn
 1               5


<210> 163
<211> 28
<212> PRT
<213> Influenza virus B

<220>
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<223> transmembrane domain of Influenza B HA2 domain subtype HA2

<400> 163
His Thr Ile Leu Leu Tyr Tyr Ser Thr Ala Ala Ser Ser Leu Ala Val
 1   5   10   15
Thr Leu Met Ile Ala Ile Phe Val Val Tyr Met Val
            20   25

<210> 164
<211> 11
<212> PRT
<213> Influenza virus B

<220>
<223> cytoplasmic domain of Influenza B HA2 domain subtype HA2

<400> 164
Ser Arg Asp Asn Val Ser Cys Ser Ile Cys Leu
 1   5   10

<210> 165
<211> 23
<212> PRT
<213> Artificial Sequence

<220>
<223> turn loop linker sequence

<400> 165
Ile Thr Pro Asn Gly Ser Ile Pro Asn Asp Lys Pro Phe Gln Asn Val
 1   5   10   15
Asn Lys Ile Thr Tyr Gly Ala
            20

<210> 166
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> His tag

<400> 166
His His His His His His
 1   5

<210> 167
<211> 29
<212> PRT
<213> Artificial Sequence

<220>
<223> example of a foldon domain

<400> 167
Gly Ser Gly Tyr Ile Pro Glu Ala Pro Arg Asp Gly Gln Ala Tyr Val
 1   5   10   15
Arg Lys Asp Gly Glu Trp Val Leu Leu Ser Thr Phe Leu
            20   25

<210> 168
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> thrombin cleavage site

<400> 168
Leu Val Pro Arg Gly Ser Pro
 1   5

<210> 169
<400> 169
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<210> 170
<400> 170
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<210> 171
<400> 171
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<210> 172
<400> 172
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<210> 173
<400> 173
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<210> 174
<400> 174
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<210> 175
<400> 175
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<210> 176
<400> 176
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<210> 177
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H1(no Cys)
      Short Stem Domain sequence

<400> 177
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu
        35   40

<210> 178
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype
H1(no Cys-delta 1) Short Stem Domain sequence

<400> 178
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu
        35   40

<210> 179
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype
H1(no Cys-delta 3) Short Stem Domain sequence

<400> 179
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys
        35   40

<210> 180
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H2(no Cys)
Short Stem Domain sequence

<400> 180
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
 1   5   10   15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
            20   25   30
Leu Glu Lys Thr His Asn Gly Lys Leu
        35   40

<210> 181
<211> 41
<212> PRT
<213> Influenza virus A

<220>

<223> N-terminal stem segment of Influenza A HA subtype H2(no Cys-delta 1)
Short Stem Domain sequence

<400> 181
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
1 5 10 15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
20 25 30
Leu Glu Lys Thr His Asn Gly Lys Leu
35 40

<210> 182
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H2(no Cys-delta 3)
Short Stem Domain sequence

<400> 182
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
1 5 10 15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
20 25 30
Leu Glu Lys Thr His Asn Gly Lys
35 40

<210> 183
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H3(no Cys)
Short Stem Domain sequence

<400> 183
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
1 5 10 15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
20 25 30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
35 40 45
Gly Lys Ile
50

<210> 184
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H3(no Cys-delta 1)
Short Stem Domain sequence

<400> 184
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
1 5 10 15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp

```
            20                  25                  30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
        35                  40                  45
Gly Lys Ile
    50


<210> 185
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H3(no Cys-delta 3)
      Short Stem Domain sequence

<400> 185
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
 1               5                  10                  15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
            20                  25                  30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
        35                  40                  45
Gly Lys
    50


<210> 186
<211> 47
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H4(no Cys)
      Short Stem Domain sequence

<400> 186
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
 1               5                  10                  15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
            20                  25                  30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu
        35                  40                  45


<210> 187
<211> 47
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H4(no Cys-delta 1)
      Short Stem Domain sequence

<400> 187
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
 1               5                  10                  15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
            20                  25                  30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu
        35                  40                  45
```

<210> 188
<211> 46
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H4(no Cys-delta 3)
Short Stem Domain sequence

<400> 188
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
1 5 10 15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
20 25 30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu
35 40 45

<210> 189
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H5(no Cys)
Short Stem Domain sequence

<400> 189
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
1 5 10 15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
20 25 30
Leu Glu Arg Thr His Asn Gly Lys Leu
35 40

<210> 190
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H5(no Cys-delta 1)
Short Stem Domain sequence

<400> 190
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
1 5 10 15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
20 25 30
Leu Glu Arg Thr His Asn Gly Lys Leu
35 40

<210> 191
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H5(no Cys-delta 3)

Short Stem Domain sequence

<400> 191
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
 1   5   10   15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
            20   25   30
Leu Glu Arg Thr His Asn Gly Lys
        35   40

<210> 192
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H6(no Cys)
Short Stem Domain sequence

<400> 192
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
 1   5   10   15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
            20   25   30
Leu Glu Asn Gln Lys Glu Glu Arg Phe
        35   40

<210> 193
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H6(no Cys-delta 1)
Short Stem Domain sequence

<400> 193
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
 1   5   10   15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
            20   25   30
Leu Glu Asn Gln Lys Glu Glu Arg Phe
        35   40

<210> 194
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H6(no Cys-delta 3)
Short Stem Domain sequence

<400> 194
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
 1   5   10   15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
            20   25   30
Leu Glu Asn Gln Lys Glu Glu Arg
        35   40

<210> 195
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H7(no Cys)
Short Stem Domain sequence

<400> 195
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Arg Thr Asn Ile Pro Lys Ile
35 40

<210> 196
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H7(no Cys-delta 1)
Short Stem Domain sequence

<400> 196
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Arg Thr Asn Ile Pro Lys Ile
35 40

<210> 197
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H7(no Cys-delta 3)
Short Stem Domain sequence

<400> 197
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Arg Thr Asn Ile Pro Lys
35 40

<210> 198
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H8(no Cys)

Short Stem Domain sequence

<400> 198
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr
        35   40

<210> 199
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H8(no Cys-delta 1)
Short Stem Domain sequence

<400> 199
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr
        35   40

<210> 200
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H8(no Cys-delta 3)
Short Stem Domain sequence

<400> 200
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala
        35   40

<210> 201
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H9(no Cys)
Short Stem Domain sequence

<400> 201
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
 1   5   10   15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
            20   25   30
Leu His Thr Glu His Asn Gly Met Leu
        35   40

<210> 202
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H9(no Cys-delta 1)
Short Stem Domain sequence

<400> 202
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
20 25 30
Leu His Thr Glu His Asn Gly Met Leu
35 40

<210> 203
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H9(no Cys-delta 3)
Short Stem Domain sequence

<400> 203
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
20 25 30
Leu His Thr Glu His Asn Gly Met
35 40

<210> 204
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H10(no Cys)
Short Stem Domain sequence

<400> 204
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
1 5 10 15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
20 25 30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu
35 40

<210> 205
<211> 42
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H10(no Cys-delta 1)

Short Stem Domain sequence

<400> 205
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
 1   5   10   15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
            20   25   30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu
        35   40

<210> 206
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H10(no Cys-delta 3)
Short Stem Domain sequence

<400> 206
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
 1   5   10   15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
            20   25   30
Thr Val Glu Ser Thr Asn Leu Asn Lys
        35   40

<210> 207
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H11(no Cys)
Short Stem Domain sequence

<400> 207
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1   5   10   15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20   25   30
Val Glu Thr Glu His Thr Gly Ser Phe
        35   40

<210> 208
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H11(no Cys-delta 1)
Short Stem Domain sequence

<400> 208
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1   5   10   15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20   25   30
Val Glu Thr Glu His Thr Gly Ser Phe
        35   40

<210> 209
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H11(no Cys-delta 3)
Short Stem Domain sequence

<400> 209
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
1 5 10 15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
20 25 30
Val Glu Thr Glu His Thr Gly Ser
35 40

<210> 210
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H12(no Cys)
Short Stem Domain sequence

<400> 210
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
1 5 10 15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
20 25 30
Val His Arg Gly Ile Asp Pro Ile Leu
35 40

<210> 211
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H12(no Cys-delta 1)
Short Stem Domain sequence

<400> 211
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
1 5 10 15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
20 25 30
Val His Arg Gly Ile Asp Pro Ile Leu
35 40

<210> 212
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H12(no Cys-delta 3)

Short Stem Domain sequence

<400> 212
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
 1   5   10   15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
            20   25   30
Val His Arg Gly Ile Asp Pro Ile
        35   40

<210> 213
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H13(no Cys)
Short Stem Domain sequence

<400> 213
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
 1   5   10   15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
            20   25   30
Ile Glu Thr Asn His Thr Gly Thr Tyr
        35   40

<210> 214
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H13(no Cys-delta 1)
Short Stem Domain sequence

<400> 214
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
 1   5   10   15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
            20   25   30
Ile Glu Thr Asn His Thr Gly Thr Tyr
        35   40

<210> 215
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H13(no Cys-delta 3)
Short Stem Domain sequence

<400> 215
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
 1   5   10   15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
            20   25   30
Ile Glu Thr Asn His Thr Gly Thr
        35   40

<210> 216
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H14(no Cys)
Short Stem Domain sequence

<400> 216
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
1 5 10 15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
20 25 30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
35 40 45
Glu Leu
50

<210> 217
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H14(no Cys-delta 1)
Short Stem Domain sequence

<400> 217
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
1 5 10 15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
20 25 30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
35 40 45
Glu Leu
50

<210> 218
<211> 49
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H14(no Cys-delta 3)
Short Stem Domain sequence

<400> 218
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
1 5 10 15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
20 25 30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
35 40 45
Glu

<210> 219

<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H15(no Cys)
Short Stem Domain sequence

<400> 219
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Ile Thr Gly Ile Asp Lys Val
35 40

<210> 220
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H15(no Cys-delta 1)
Short Stem Domain sequence

<400> 220
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Ile Thr Gly Ile Asp Lys Val
35 40

<210> 221
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H15(no Cys-delta 3)
Short Stem Domain sequence

<400> 221
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Ile Thr Gly Ile Asp Lys
35 40

<210> 222
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H16(no Cys)
Short Stem Domain sequence

<400> 222

```
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
 1               5                  10                  15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
            20                  25                  30
Val Glu Thr Asn His Thr Gly Thr Tyr
        35                  40
```

<210> 223
<211> 41
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H16(no Cys-delta 1)
Short Stem Domain sequence

<400> 223

```
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
 1               5                  10                  15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
            20                  25                  30
Val Glu Thr Asn His Thr Gly Thr Tyr
        35                  40
```

<210> 224
<211> 40
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H16(no Cys-delta 3)
Short Stem Domain sequence

<400> 224

```
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
 1               5                  10                  15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
            20                  25                  30
Val Glu Thr Asn His Thr Gly Thr
        35                  40
```

<210> 225
<400> 225
000

<210> 226
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(no Cys)

<400> 226

```
Asn Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Ser Ser Leu Pro
 1               5                  10                  15
Tyr Gln Asn Ile His Pro Val Thr Ile Gly Glu Cys Pro Lys Tyr Val
            20                  25                  30
Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn Pro Ser
```

        35   40   45
Ile Gln Ser Arg
    50

<210> 227
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(no Cys-delta 1)

<400> 227
Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Ser Ser Leu Pro Tyr
 1   5   10   15
Gln Asn Ile His Pro Val Thr Ile Gly Glu Cys Pro Lys Tyr Val Arg
            20   25   30
Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn Pro Ser Ile
        35   40   45
Gln Ser Arg
    50

<210> 228
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(no Cys-delta 3)

<400> 228
Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Ser Ser Leu Pro Tyr Gln
 1   5   10   15
Asn Ile His Pro Val Thr Ile Gly Glu Cys Pro Lys Tyr Val Arg Ser
            20   25   30
Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn Pro Ser Ile Gln
        35   40   45
Ser Arg
    50

<210> 229
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H2(no Cys)

<400> 229
Glu Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Thr Thr Leu Pro
 1   5   10   15
Phe His Asn Val His Pro Leu Thr Ile Gly Glu Cys Pro Lys Tyr Val
            20   25   30
Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln
        35   40   45
Ile Glu Ser Arg
    50

<210> 230

<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H2(no Cys-delta 1)

<400> 230
Thr Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Thr Thr Leu Pro Phe
 1   5   10   15
His Asn Val His Pro Leu Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys
            20   25   30
Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile
        35   40   45
Glu Ser Arg
    50

<210> 231
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H2(no Cys-delta 3)

<400> 231
Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Thr Thr Leu Pro Phe His
 1   5   10   15
Asn Val His Pro Leu Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser
            20   25   30
Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu
        35   40   45
Ser Arg
    50

<210> 232
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H3(no Cys)

<400> 232
Ile Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Pro Asn Asp Lys Pro
 1   5   10   15
Phe Gln Asn Val Asn Lys Ile Thr Tyr Gly Ala Cys Pro Lys Tyr Val
            20   25   30
Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg Asn Val Pro Glu
        35   40   45
Lys Gln Thr Arg
    50

<210> 233
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H3(no Cys-delta 1)

<400> 233
Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Pro Asn Asp Lys Pro Phe
 1   5   10   15
Gln Asn Val Asn Lys Ile Thr Tyr Gly Ala Cys Pro Lys Tyr Val Lys
            20   25   30
Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg Asn Val Pro Glu Lys
        35   40   45
Gln Thr Arg
    50

<210> 234
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H3(no Cys-delta 3)

<400> 234
Glu Cys Ile Thr Pro Asn Gly Ser Ile Pro Asn Asp Lys Pro Phe Gln
 1   5   10   15
Asn Val Asn Lys Ile Thr Tyr Gly Ala Cys Pro Lys Tyr Val Lys Gln
            20   25   30
Asn Thr Leu Lys Leu Ala Thr Gly Met Arg Asn Val Pro Glu Lys Gln
        35   40   45
Thr Arg
    50

<210> 235
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H4(no Cys)

<400> 235
Val Ser Lys Cys His Thr Asp Lys Gly Ser Leu Ser Thr Thr Lys Pro
 1   5   10   15
Phe Gln Asn Ile Ser Arg Ile Ala Val Gly Asp Cys Pro Arg Tyr Val
            20   25   30
Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn Ile Pro Glu
        35   40   45
Lys Ala Ser Arg
    50

<210> 236
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H4(no Cys-delta 1)

<400> 236
Ser Lys Cys His Thr Asp Lys Gly Ser Leu Ser Thr Thr Lys Pro Phe
 1   5   10   15
Gln Asn Ile Ser Arg Ile Ala Val Gly Asp Cys Pro Arg Tyr Val Lys
            20   25   30

Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn Ile Pro Glu Lys
35 40 45
Ala Ser Arg
50

<210> 237
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H4(no Cys-delta 3)

<400> 237
Lys Cys His Thr Asp Lys Gly Ser Leu Ser Thr Thr Lys Pro Phe Gln
1 5 10 15
Asn Ile Ser Arg Ile Ala Val Gly Asp Cys Pro Arg Tyr Val Lys Gln
20 25 30
Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn Ile Pro Glu Lys Ala
35 40 45
Ser Arg
50

<210> 238
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H5(no Cys)

<400> 238
Asp Thr Lys Cys Gln Thr Pro Val Gly Glu Ile Asn Ser Ser Met Pro
1 5 10 15
Phe His Asn Ile His Pro His Thr Ile Gly Glu Cys Pro Lys Tyr Val
20 25 30
Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln
35 40 45
Arg Lys Lys Arg
50

<210> 239
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H5(no Cys-delta 1)

<400> 239
Thr Lys Cys Gln Thr Pro Val Gly Glu Ile Asn Ser Ser Met Pro Phe
1 5 10 15
His Asn Ile His Pro His Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys
20 25 30
Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Arg
35 40 45
Lys Lys Arg
50

<210> 240
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H5(no Cys-delta 3)

<400> 240
Lys Cys Gln Thr Pro Val Gly Glu Ile Asn Ser Ser Met Pro Phe His
 1   5   10   15
Asn Ile His Pro His Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser
            20   25   30
Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Arg Lys
        35   40   45
Lys Arg
    50

<210> 241
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H6(no Cys)

<400> 241
Asp Ala Thr Cys Gln Thr Val Ala Gly Val Leu Arg Thr Asn Lys Thr
 1   5   10   15
Phe Gln Asn Val Ser Pro Leu Trp Ile Gly Glu Cys Pro Lys Tyr Val
            20   25   30
Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg Asn Val Pro Gln
        35   40   45
Ile Glu Thr Arg
    50

<210> 242
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H6(no Cys-delta 1)

<400> 242
Ala Thr Cys Gln Thr Val Ala Gly Val Leu Arg Thr Asn Lys Thr Phe
 1   5   10   15
Gln Asn Val Ser Pro Leu Trp Ile Gly Glu Cys Pro Lys Tyr Val Lys
            20   25   30
Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile
        35   40   45
Glu Thr Arg
    50

<210> 243
<211> 50
<212> PRT
<213> Influenza virus A

<220>

<223> C-terminal stem segment of Influenza A HA subtype H6(no Cys-delta 3)

<400> 243
Thr Cys Gln Thr Val Ala Gly Val Leu Arg Thr Asn Lys Thr Phe Gln
 1   5   10   15
Asn Val Ser Pro Leu Trp Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser
            20   25   30
Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu
        35   40   45
Thr Arg
    50

<210> 244
<211> 56
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H7(no Cys)

<400> 244
Glu Gly Glu Cys Tyr His Ser Gly Gly Thr Ile Thr Ser Arg Leu Pro
 1   5   10   15
Phe Gln Asn Ile Asn Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val
            20   25   30
Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn Val Pro Glu
        35   40   45
Pro Ser Lys Lys Arg Lys Lys Arg
    50   55

<210> 245
<211> 55
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H7(no Cys-delta 1)

<400> 245
Gly Glu Cys Tyr His Ser Gly Gly Thr Ile Thr Ser Arg Leu Pro Phe
 1   5   10   15
Gln Asn Ile Asn Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val Lys
            20   25   30
Gln Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn Val Pro Glu Pro
        35   40   45
Ser Lys Lys Arg Lys Lys Arg
    50   55

<210> 246
<211> 54
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H7(no Cys-delta 3)

<400> 246
Glu Cys Tyr His Ser Gly Gly Thr Ile Thr Ser Arg Leu Pro Phe Gln
 1   5   10   15
Asn Ile Asn Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val Lys Gln

            20   25   30
Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn Val Pro Glu Pro Ser
        35   40   45
Lys Lys Arg Lys Lys Arg
    50

<210> 247
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H8(no Cys)

<400> 247
Asn Thr Lys Cys Gln Thr Tyr Ala Gly Ala Ile Asn Ser Ser Lys Pro
 1   5   10   15
Phe Gln Asn Ala Ser Arg His Tyr Met Gly Glu Cys Pro Lys Tyr Val
            20   25   30
Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn Thr Pro Ser
        35   40   45
Val Glu Pro Arg
    50

<210> 248
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H8(no Cys-delta 1)

<400> 248
Thr Lys Cys Gln Thr Tyr Ala Gly Ala Ile Asn Ser Ser Lys Pro Phe
 1   5   10   15
Gln Asn Ala Ser Arg His Tyr Met Gly Glu Cys Pro Lys Tyr Val Lys
            20   25   30
Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn Thr Pro Ser Val
        35   40   45
Glu Pro Arg
    50

<210> 249
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H8(no Cys-delta 3)

<400> 249
Lys Cys Gln Thr Tyr Ala Gly Ala Ile Asn Ser Ser Lys Pro Phe Gln
 1   5   10   15
Asn Ala Ser Arg His Tyr Met Gly Glu Cys Pro Lys Tyr Val Lys Lys
            20   25   30
Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn Thr Pro Ser Val Glu
        35   40   45
Pro Arg
    50

<210> 250
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H9(no Cys)

<400> 250
Val Val Gln Cys Gln Thr Glu Lys Gly Gly Leu Asn Thr Thr Leu Pro
 1   5   10   15
Phe His Asn Ile Ser Lys Tyr Ala Phe Gly Asn Cys Pro Lys Tyr Val
            20   25   30
Gly Val Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn Val Pro Ala
        35   40   45
Val Ser Ser Arg
    50

<210> 251
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H9(no Cys-delta 1)

<400> 251
Val Gln Cys Gln Thr Glu Lys Gly Gly Leu Asn Thr Thr Leu Pro Phe
 1   5   10   15
His Asn Ile Ser Lys Tyr Ala Phe Gly Asn Cys Pro Lys Tyr Val Gly
            20   25   30
Val Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn Val Pro Ala Val
        35   40   45
Ser Ser Arg
    50

<210> 252
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H9(no Cys-delta 3)

<400> 252
Gln Cys Gln Thr Glu Lys Gly Gly Leu Asn Thr Thr Leu Pro Phe His
 1   5   10   15
Asn Ile Ser Lys Tyr Ala Phe Gly Asn Cys Pro Lys Tyr Val Gly Val
            20   25   30
Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn Val Pro Ala Val Ser
        35   40   45
Ser Arg
    50

<210> 253
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H10(no Cys)

<400> 253
Glu Ser Lys Cys Phe Trp Arg Gly Gly Ser Ile Asn Thr Lys Leu Pro
 1   5   10   15
Phe Gln Asn Leu Ser Pro Arg Thr Val Gly Gln Cys Pro Lys Tyr Val
            20   25   30
Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn Val Pro Glu
        35   40   45
Val Val Gln Gly Arg
    50

<210> 254
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H10(no Cys-delta 1)

<400> 254
Ser Lys Cys Phe Trp Arg Gly Gly Ser Ile Asn Thr Lys Leu Pro Phe
 1   5   10   15
Gln Asn Leu Ser Pro Arg Thr Val Gly Gln Cys Pro Lys Tyr Val Asn
            20   25   30
Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn Val Pro Glu Val
        35   40   45
Val Gln Gly Arg
    50

<210> 255
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H10(no Cys-delta 3)

<400> 255
Lys Cys Phe Trp Arg Gly Gly Ser Ile Asn Thr Lys Leu Pro Phe Gln
 1   5   10   15
Asn Leu Ser Pro Arg Thr Val Gly Gln Cys Pro Lys Tyr Val Asn Gln
            20   25   30
Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn Val Pro Glu Val Val
        35   40   45
Gln Gly Arg
    50

<210> 256
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H11(no Cys)

<400> 256
Ser Thr Lys Cys Gln Thr Glu Ile Gly Gly Ile Asn Thr Asn Lys Ser
 1   5   10   15

Phe His Asn Val His Arg Asn Thr Ile Gly Asp Cys Pro Lys Tyr Val
            20   25   30
Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn Val Pro Ala
        35   40   45
Ile Ala Ser Arg
    50

<210> 257
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H11(no Cys-delta 1)

<400> 257
Thr Lys Cys Gln Thr Glu Ile Gly Gly Ile Asn Thr Asn Lys Ser Phe
 1   5   10   15
His Asn Val His Arg Asn Thr Ile Gly Asp Cys Pro Lys Tyr Val Asn
            20   25   30
Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn Val Pro Ala Ile
        35   40   45
Ala Ser Arg
    50

<210> 258
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H11(no Cys-delta 3)

<400> 258
Lys Cys Gln Thr Glu Ile Gly Gly Ile Asn Thr Asn Lys Ser Phe His
 1   5   10   15
Asn Val His Arg Asn Thr Ile Gly Asp Cys Pro Lys Tyr Val Asn Val
            20   25   30
Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn Val Pro Ala Ile Ala
        35   40   45
Ser Arg
    50

<210> 259
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H12(no Cys)

<400> 259
Val Thr Glu Cys Gln Leu Asn Glu Gly Val Met Asn Thr Ser Lys Pro
 1   5   10   15
Phe Gln Asn Thr Ser Lys His Tyr Ile Gly Lys Cys Pro Lys Tyr Ile
            20   25   30
Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn Val Pro Gln
        35   40   45
Val Gln Asp Arg
    50

<210> 260
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H12(no Cys-delta 1)

<400> 260
Thr Glu Cys Gln Leu Asn Glu Gly Val Met Asn Thr Ser Lys Pro Phe
 1   5   10   15
Gln Asn Thr Ser Lys His Tyr Ile Gly Lys Cys Pro Lys Tyr Ile Pro
            20   25   30
Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn Val Pro Gln Val
        35   40   45
Gln Asp Arg
    50

<210> 261
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H12(no Cys-delta 3)

<400> 261
Glu Cys Gln Leu Asn Glu Gly Val Met Asn Thr Ser Lys Pro Phe Gln
 1   5   10   15
Asn Thr Ser Lys His Tyr Ile Gly Lys Cys Pro Lys Tyr Ile Pro Ser
            20   25   30
Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn Val Pro Gln Val Gln
        35   40   45
Asp Arg
    50

<210> 262
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H13(no Cys)

<400> 262
Asn Thr Lys Cys Gln Thr Ser Val Gly Gly Ile Asn Thr Asn Arg Thr
 1   5   10   15
Phe Gln Asn Ile Asp Lys Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile
            20   25   30
Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro Ala
        35   40   45
Ile Ser Asn Arg
    50

<210> 263
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H13(no Cys-delta 1)

<400> 263
Thr Lys Cys Gln Thr Ser Val Gly Gly Ile Asn Thr Asn Arg Thr Phe
 1   5   10   15
Gln Asn Ile Asp Lys Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys
            20   25   30
Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro Ala Ile
        35   40   45
Ser Asn Arg
    50

<210> 264
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H13(no Cys-delta 3)

<400> 264
Lys Cys Gln Thr Ser Val Gly Gly Ile Asn Thr Asn Arg Thr Phe Gln
 1   5   10   15
Asn Ile Asp Lys Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser
            20   25   30
Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro Ala Ile Ser
        35   40   45
Asn Arg
    50

<210> 265
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H14(no Cys)

<400> 265
Thr Ser Pro Cys Leu Thr Asp Lys Gly Ser Ile Gln Ser Asp Lys Pro
 1   5   10   15
Phe Gln Asn Val Ser Arg Ile Ala Ile Gly Asn Cys Pro Lys Tyr Val
            20   25   30
Lys Gln Gly Ser Leu Met Leu Ala Thr Gly Met Arg Asn Ile Pro Gly
        35   40   45
Lys Gln Ala Lys
    50

<210> 266
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H14(no Cys-delta 1)

<400> 266
Ser Pro Cys Leu Thr Asp Lys Gly Ser Ile Gln Ser Asp Lys Pro Phe

 1   5   10   15
Gln Asn Val Ser Arg Ile Ala Ile Gly Asn Cys Pro Lys Tyr Val Lys
            20   25   30
Gln Gly Ser Leu Met Leu Ala Thr Gly Met Arg Asn Ile Pro Gly Lys
        35   40   45
Gln Ala Lys
    50

<210> 267
<211> 50
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H14(no Cys-delta 3)

<400> 267
Pro Cys Leu Thr Asp Lys Gly Ser Ile Gln Ser Asp Lys Pro Phe Gln
 1   5   10   15
Asn Val Ser Arg Ile Ala Ile Gly Asn Cys Pro Lys Tyr Val Lys Gln
            20   25   30
Gly Ser Leu Met Leu Ala Thr Gly Met Arg Asn Ile Pro Gly Lys Gln
        35   40   45
Ala Lys
    50

<210> 268
<211> 53
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H15(no Cys)

<400> 268
Glu Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro Leu Pro
 1   5   10   15
Phe Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val
            20   25   30
Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val Pro Glu
        35   40   45
Lys Ile Arg Thr Arg
    50

<210> 269
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H15(no Cys-delta 1)

<400> 269
Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro Leu Pro Phe
 1   5   10   15
Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val Lys
            20   25   30
Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val Pro Glu Lys
        35   40   45
Ile Arg Thr Arg

50

<210> 270
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H15(no Cys-delta 3)

<400> 270
Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro Leu Pro Phe Gln
 1   5   10   15
Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val Lys Gln
            20   25   30
Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val Pro Glu Lys Ile
        35   40   45
Arg Thr Arg
    50

<210> 271
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H16(no Cys)

<400> 271
Asn Thr Lys Cys Gln Thr Ser Leu Gly Gly Ile Asn Thr Asn Lys Thr
 1   5   10   15
Phe Gln Asn Ile Glu Arg Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile
            20   25   30
Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro Ser
        35   40   45
Ile Gly Glu Arg
    50

<210> 272
<211> 51
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H16(no Cys-delta 1)

<400> 272
Thr Lys Cys Gln Thr Ser Leu Gly Gly Ile Asn Thr Asn Lys Thr Phe
 1   5   10   15
Gln Asn Ile Glu Arg Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys
            20   25   30
Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro Ser Ile
        35   40   45
Gly Glu Arg
    50

<210> 273
<211> 50
<212> PRT

<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H16(no Cys-delta 3)

<400> 273
Lys Cys Gln Thr Ser Leu Gly Gly Ile Asn Thr Asn Lys Thr Phe Gln
 1   5   10   15
Asn Ile Glu Arg Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser
            20   25   30
Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val Pro Ser Ile Gly
        35   40   45
Glu Arg
    50

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<210> 308
<211> 44
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H3(HK68-CON-A)

<400> 308
Ser Thr Ala Thr Leu Cys Leu Gly His His Ala Val Pro Asn Gly Thr
 1   5   10   15
Leu Val Lys Thr Ile Thr Asp Asp Gln Ile Glu Val Thr Asn Ala Thr
            20   25   30
Glu Leu Val Gln Ser Ser Ser Thr Gly Lys Ile Cys
        35   40

<210> 309
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H3(HK68-CON-B)

<400> 309
Cys Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
 1   5   10   15
Asn Val Pro Glu Lys Gln Thr Arg
            20

<210> 310
<211> 97
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H3(HK68-CON-C)

<400> 310
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
 1   5   10   15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
            20   25   30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
        35   40   45
Gly Lys Ile Cys Asn Asn Pro His Arg Ile Leu Asp Gly Ile Asp Cys
    50   55   60
Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro His Cys Asp Val Phe Gln
65   70   75   80
Asn Glu Thr Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Phe Ser Asn
                85   90   95
Cys

<210> 311
<211> 74
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H3(HK68-CON-C)

<400> 311
Ala Pro Arg Gly Tyr Phe Lys Met Arg Thr Gly Lys Ser Ser Ile Met

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 1               5                  10                  15
Ser Ser Asp Ala Pro Ile Asp Thr Cys Ile Ser Glu Cys Ile Thr Pro
            20                  25                  30
Asn Gly Ser Ile Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Ile
        35                  40                  45
Thr Tyr Gly Ala Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu
    50                  55                  60
Ala Thr Gly Met Arg Asn Val Pro Glu Lys
65                  70
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<210> 312
<211> 46
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H1(HK68-CON-A)

<400> 312

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Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1               5                  10                  15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20                  25                  30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Cys
        35                  40                  45
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<210> 313
<211> 52
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(HK68-CON-A)

<400> 313

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Cys Lys Cys Gln Thr Pro Leu Gly Ala Ile Asn Ser Ser Leu Pro Tyr
 1               5                  10                  15
Gln Asn Ile His Pro Val Thr Ile Gly Glu Cys Pro Lys Tyr Val Arg
            20                  25                  30
Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn Pro Ser Ile
        35                  40                  45
Gln Ser Arg Gly
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<223> C-terminal stem segment of Influenza A HA subtype H1(HK68-CON-B)

<400> 314

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Cys Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn
 1               5                  10                  15
Pro Ser Ile Gln Ser Arg Gly
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<211> 94
<212> PRT
<213> Influenza virus A

<220>
<223> N-terminal stem segment of Influenza A HA subtype H1(HK68-CON-C)

<400> 315
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Gly Ile Ala
        35   40   45
Pro Leu Gln Leu Gly Lys Cys Asn Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Pro Leu Leu Pro Val Arg Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Thr Pro Asn Ser Glu Asn Gly Ile Cys Tyr Pro Gly Cys
                85   90

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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(HK68-CON-C)

<400> 316
Ala Phe Ala Leu Ser Arg Gly Phe Gly Ser Gly Ile Ile Thr Ser Asn
 1   5   10   15
Ala Ser Met His Glu Cys Asn Thr Lys Cys Gln Thr Pro Leu Gly Ala
            20   25   30
Ile Asn Ser Ser Leu Pro Tyr Gln Asn Ile His Pro Val Thr Ile Gly
        35   40   45
Glu Cys Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly
    50   55   60
Leu Arg Asn Asn Pro Ser Ile Gln Ser Arg Gly
65   70   75

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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H1

<400> 350
Cys Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu
1 5 10 15
Arg Asn Asn Pro Ser Ile Gln Ser Arg
20 25

<210> 351
<211> 25
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H2

<400> 351
Cys Pro Lys Tyr Val Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu
1 5 10 15
Arg Asn Val Pro Gln Ile Glu Ser Arg
20 25

<210> 352
<211> 25
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H3

<400> 352
Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met
1 5 10 15
Arg Asn Val Pro Glu Lys Gln Thr Arg
20 25

<210> 353
<211> 25
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H4

<400> 353
Cys Pro Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met
 1   5   10   15
Arg Asn Ile Pro Glu Lys Ala Ser Arg
            20   25

<210> 354
<211> 25
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H5

<400> 354
Cys Pro Lys Tyr Val Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu
 1   5   10   15
Arg Asn Val Pro Gln Arg Lys Lys Arg
            20   25

<210> 355
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H6

<400> 355
Cys Pro Lys Tyr Val Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu
 1   5   10   15
Arg Asn Val Pro Gln Ile Glu Thr Arg
            20   25

<210> 356
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H7

<400> 356
Cys Pro Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly Met
 1   5   10   15
Lys Asn Val Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
            20   25

<210> 357
<211> 25

<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H8

<400> 357
Cys Pro Lys Tyr Val Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu
 1   5   10   15
Arg Asn Thr Pro Ser Val Glu Pro Arg
            20   25

<210> 358
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H9

<400> 358
Cys Pro Lys Tyr Val Gly Val Lys Ser Leu Lys Leu Pro Val Gly Leu
 1   5   10   15
Arg Asn Val Pro Ala Val Ser Ser Arg
            20   25

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<212> PRT
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<220>
<223> C-terminal short stem segment of Influenza A HA subtype H10

<400> 359
Cys Pro Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly Met
 1   5   10   15
Arg Asn Val Pro Glu Val Val Gln Gly Arg
            20   25

<210> 360
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal short stem segment of Influenza A HA subtype H11

<400> 360
Cys Pro Lys Tyr Val Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro
 1   5   10   15
Arg Asn Val Pro Ala Ile Ala Ser Arg
            20   25

<210> 361
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<220>
<223> C-terminal short stem segment of Influenza A HA subtype H12

<400> 361
Cys Pro Lys Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu
 1   5   10   15
Arg Asn Val Pro Gln Val Gln Asp Arg
            20   25

<210> 362
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<220>
<223> C-terminal short stem segment of Influenza A HA subtype H13

<400> 362
Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu
 1   5   10   15
Arg Asn Val Pro Ala Ile Ser Asn Arg
            20   25

<210> 363
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<212> PRT
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<220>
<223> C-terminal short stem segment of Influenza A HA subtype H14

<400> 363
Cys Pro Lys Tyr Val Lys Gln Gly Ser Leu Met Leu Ala Thr Gly Met
 1   5   10   15
Arg Asn Ile Pro Gly Lys Gln Ala Lys
            20   25

<210> 364
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<212> PRT
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<220>
<223> C-terminal short stem segment of Influenza A HA subtype H15

<400> 364
Cys Pro Arg Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met
 1   5   10   15
Lys Asn Val Pro Glu Lys Ile Arg Thr Arg
            20   25

<210> 365
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<212> PRT
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<220>
<223> C-terminal short stem segment of Influenza A HA subtype H16

<400> 365
Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu
 1   5   10   15
Arg Asn Val Pro Ser Ile Gly Glu Arg
            20   25

<210> 366
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(no Cys)

<400> 366
Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg
 1   5   10   15
Asn Asn Pro Ser Ile Gln Ser Arg
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<210> 367
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(no Cys-delta 1)

<400> 367
Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn
 1   5   10   15
Asn Pro Ser Ile Gln Ser Arg
            20

<210> 368
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H1(no Cys-delta 3)

<400> 368
Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr Gly Leu Arg Asn Asn
 1   5   10   15
Pro Ser Ile Gln Ser Arg
            20

<210> 369
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H2(no Cys)

<400> 369
Pro Lys Tyr Val Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg
 1   5   10   15

Asn Val Pro Gln Ile Glu Ser Arg
            20

<210> 370
<211> 23
<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H2(no Cys-delta 1)

<400> 370
Lys Tyr Val Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn
 1   5   10   15
Val Pro Gln Ile Glu Ser Arg
            20

<210> 371
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H2(no Cys-delta 3)

<400> 371
Tyr Val Lys Ser Glu Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val
 1   5   10   15
Pro Gln Ile Glu Ser Arg
            20

<210> 372
<211> 24
<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H3(no Cys)

<400> 372
Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
 1   5   10   15
Asn Val Pro Glu Lys Gln Thr Arg
            20

<210> 373
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<212> PRT
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<400> 373
Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg Asn
 1   5   10   15
Val Pro Glu Lys Gln Thr Arg
            20

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<220>
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<400> 374
Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg Asn Val
 1   5   10   15
Pro Glu Lys Gln Thr Arg
            20

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<220>
<223> C-terminal stem segment of Influenza A HA subtype H4(no Cys)

<400> 375
Pro Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg
 1   5   10   15
Asn Ile Pro Glu Lys Ala Ser Arg
            20

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<220>
<223> C-terminal stem segment of Influenza A HA subtype H4(no Cys-delta 1)

<400> 376
Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn
 1   5   10   15
Ile Pro Glu Lys Ala Ser Arg
            20

<210> 377
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H4(no Cys-delta 3)

<400> 377
Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala Thr Gly Met Arg Asn Ile
 1   5   10   15
Pro Glu Lys Ala Ser Arg
            20

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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H5(no Cys)

<400> 378
Pro Lys Tyr Val Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg
 1   5   10   15
Asn Val Pro Gln Arg Lys Lys Arg
            20

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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H5(no Cys-delta 1)

<400> 379
Lys Tyr Val Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn
 1   5   10   15
Val Pro Gln Arg Lys Lys Arg
            20

<210> 380
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H5(no Cys-delta 3)

<400> 380
Tyr Val Lys Ser Asp Arg Leu Val Leu Ala Thr Gly Leu Arg Asn Val
 1   5   10   15
Pro Gln Arg Lys Lys Arg
            20

<210> 381
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H6(no Cys)

<400> 381
Pro Lys Tyr Val Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg
 1   5   10   15
Asn Val Pro Gln Ile Glu Thr Arg
            20

<210> 382
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H6(no Cys-delta 1)

<400> 382
Lys Tyr Val Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg Asn
 1   5   10   15
Val Pro Gln Ile Glu Thr Arg
            20

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<220>
<223> C-terminal stem segment of Influenza A HA subtype H6(no Cys-delta 3)

<400> 383
Tyr Val Lys Ser Glu Ser Leu Arg Leu Ala Thr Gly Leu Arg Asn Val
 1   5   10   15
Pro Gln Ile Glu Thr Arg
            20

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<220>
<223> C-terminal stem segment of Influenza A HA subtype H7(no Cys)

<400> 384
Pro Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly Met Lys
 1   5   10   15
Asn Val Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
            20   25

<210> 385
<211> 27
<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H7(no Cys-delta 1)

<400> 385
Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn
 1   5   10   15
Val Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
            20   25

<210> 386
<211> 26
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H7(no Cys-delta 3)

<400> 386
Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly Met Lys Asn Val
 1   5   10   15
Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
            20   25

<210> 387
<211> 24
<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H8(no Cys)

<400> 387
Pro Lys Tyr Val Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg
 1   5   10   15
Asn Thr Pro Ser Val Glu Pro Arg
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<210> 388
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<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H8(no Cys-delta 1)

<400> 388
Lys Tyr Val Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn
 1   5   10   15
Thr Pro Ser Val Glu Pro Arg
            20

<210> 389
<211> 22
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H8(no Cys-delta 3)

<400> 389
Tyr Val Lys Lys Ala Ser Leu Arg Leu Ala Val Gly Leu Arg Asn Thr
 1   5   10   15
Pro Ser Val Glu Pro Arg
            20

<210> 390
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H9(no Cys)

<400> 390
Pro Lys Tyr Val Gly Val Lys Ser Leu Lys Leu Pro Val Gly Leu Arg
 1   5   10   15

Asn Val Pro Ala Val Ser Ser Arg
            20

<210> 391
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H9(no Cys-delta 1)

<400> 391
Lys Tyr Val Gly Val Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn
 1   5   10   15
Val Pro Ala Val Ser Ser Arg
            20

<210> 392
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<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H9(no Cys-delta 3)

<400> 392
Tyr Val Gly Val Lys Ser Leu Lys Leu Pro Val Gly Leu Arg Asn Val
 1   5   10   15
Pro Ala Val Ser Ser Arg
            20

<210> 393
<211> 25
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H10(no Cys)

<400> 393
Pro Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg
 1   5   10   15
Asn Val Pro Glu Val Val Gln Gly Arg
            20   25

<210> 394
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H10(no Cys-delta 1)

<400> 394
Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn
 1   5   10   15
Val Pro Glu Val Val Gln Gly Arg
            20

<210> 395
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H10(no Cys-delta 3)

<400> 395
Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly Met Arg Asn Val
 1   5   10   15
Pro Glu Val Val Gln Gly Arg
            20

<210> 396
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H11(no Cys)

<400> 396
Pro Lys Tyr Val Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg
 1   5   10   15
Asn Val Pro Ala Ile Ala Ser Arg
            20

<210> 397
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H11(no Cys-delta 1)

<400> 397
Lys Tyr Val Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn
 1   5   10   15
Val Pro Ala Ile Ala Ser Arg
            20

<210> 398
<211> 22
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H11(no Cys-delta 3)

<400> 398
Tyr Val Asn Val Lys Ser Leu Lys Leu Ala Thr Gly Pro Arg Asn Val
 1   5   10   15
Pro Ala Ile Ala Ser Arg
            20

<210> 399
<211> 24

<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H12(no Cys)

<400> 399
Pro Lys Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg
 1   5   10   15
Asn Val Pro Gln Val Gln Asp Arg
            20

<210> 400
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H12(no Cys-delta 1)

<400> 400
Lys Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn
 1   5   10   15
Val Pro Gln Val Gln Asp Arg
            20

<210> 401
<211> 22
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H12(no Cys-delta 3)

<400> 401
Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile Gly Leu Arg Asn Val
 1   5   10   15
Pro Gln Val Gln Asp Arg
            20

<210> 402
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H13(no Cys)

<400> 402
Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg
 1   5   10   15
Asn Val Pro Ala Ile Ser Asn Arg
            20

<210> 403
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H13(no Cys-delta 1)

<400> 403
Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn
 1   5   10   15
Val Pro Ala Ile Ser Asn Arg
            20

<210> 404
<211> 22
<212> PRT
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<220>
<223> C-terminal stem segment of Influenza A HA subtype H13(no Cys-delta 3)

<400> 404
Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val
 1   5   10   15
Pro Ala Ile Ser Asn Arg
            20

<210> 405
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H14(no Cys)

<400> 405
Pro Lys Tyr Val Lys Gln Gly Ser Leu Met Leu Ala Thr Gly Met Arg
 1   5   10   15
Asn Ile Pro Gly Lys Gln Ala Lys
            20

<210> 406
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H14(no Cys-delta 1)

<400> 406
Lys Tyr Val Lys Gln Gly Ser Leu Met Leu Ala Thr Gly Met Arg Asn
 1   5   10   15
Ile Pro Gly Lys Gln Ala Lys
            20

<210> 407
<211> 22
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H14(no Cys-delta 3)

<400> 407
Tyr Val Lys Gln Gly Ser Leu Met Leu Ala Thr Gly Met Arg Asn Ile
 1   5   10   15
Pro Gly Lys Gln Ala Lys
            20

<210> 408
<211> 25
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H15(no Cys)

<400> 408
Pro Arg Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys
 1   5   10   15
Asn Val Pro Glu Lys Ile Arg Thr Arg
            20   25

<210> 409
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H15(no Cys-delta 1)

<400> 409
Arg Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn
 1   5   10   15
Val Pro Glu Lys Ile Arg Thr Arg
            20

<210> 410
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H15(no Cys-delta 3)

<400> 410
Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val
 1   5   10   15
Pro Glu Lys Ile Arg Thr Arg
            20

<210> 411
<211> 24
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H16(no Cys)

<400> 411
Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg
 1   5   10   15

Asn Val Pro Ser Ile Gly Glu Arg
            20

<210> 412
<211> 23
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H16(no Cys-delta 1)

<400> 412
Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn
 1   5   10   15
Val Pro Ser Ile Gly Glu Arg
            20

<210> 413
<211> 22
<212> PRT
<213> Influenza virus A

<220>
<223> C-terminal stem segment of Influenza A HA subtype H16(no Cys-delta 3)

<400> 413
Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr Gly Leu Arg Asn Val
 1   5   10   15
Pro Ser Ile Gly Glu Arg
            20

<210> 414
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H1

<400> 414
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Gly Ile Ala
        35   40   45
Pro Leu Gln Leu Gly Lys Cys Asn Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Pro Leu Leu Pro Val Arg Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Thr Pro Asn Ser Glu Asn Gly Ile Cys
                85   90

<210> 415
<211> 90
<212> PRT
<213> Influenza virus A

<220>

<223> N-termianl long stem domain segment of Influenza A HA subtype H2

<400> 415
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
 1   5   10   15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
            20   25   30
Leu Glu Lys Thr His Asn Gly Lys Leu Cys Lys Leu Asn Gly Ile Pro
        35   40   45
Pro Leu Glu Leu Gly Asp Cys Ser Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Arg Leu Leu Thr Val Pro Glu Trp Ser Tyr Ile Met
65   70   75   80
Glu Lys Glu Asn Pro Arg Asn Gly Leu Cys
                85   90

<210> 416
<211> 97
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H3

<400> 416
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
 1   5   10   15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
            20   25   30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
        35   40   45
Gly Lys Ile Cys Asn Asn Pro His Arg Ile Leu Asp Gly Ile Asp Cys
    50   55   60
Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro His Cys Asp Val Phe Gln
65   70   75   80
Asn Glu Thr Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Phe Ser Asn
                85   90   95
Cys

<210> 417
<211> 93
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H4

<400> 417
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
 1   5   10   15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
            20   25   30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu Cys
        35   40   45
Pro Ser Pro Leu Arg Leu Val Asp Gly Gln Thr Cys Asp Ile Ile Asn
    50   55   60
Gly Ala Leu Gly Ser Pro Gly Cys Asp His Leu Asn Gly Ala Glu Trp
65   70   75   80
Asp Val Phe Ile Glu Arg Pro Asn Ala Val Asp Thr Cys
                85   90

<210> 418
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H5

<400> 418
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
 1   5   10   15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
            20   25   30
Leu Glu Arg Thr His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Lys
        35   40   45
Pro Leu Ile Leu Arg Asp Cys Ser Val Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Met Cys Asp Glu Phe Leu Asn Leu Pro Glu Trp Leu Tyr Ile Val
65   70   75   80
Glu Lys Asp Asn Pro Ile Asn Ser Leu Cys
                85   90

<210> 419
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H6

<400> 419
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
 1   5   10   15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
            20   25   30
Leu Glu Asn Gln Lys Glu Glu Arg Phe Cys Lys Ile Leu Lys Lys Ala
        35   40   45
Pro Leu Asp Leu Lys Gly Cys Thr Ile Glu Gly Trp Ile Leu Gly Asn
    50   55   60
Pro Gln Cys Asp Leu Leu Leu Gly Asp Gln Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Pro Thr Ala Gln Asn Gly Ile Cys
                85   90

<210> 420
<211> 87
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H7

<400> 420
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
 1   5   10   15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20   25   30
Val Glu Arg Thr Asn Ile Pro Lys Ile Cys Ser Lys Gly Lys Arg Thr
        35   40   45

Thr Asp Leu Gly Gln Cys Gly Leu Leu Gly Thr Ile Thr Gly Pro Pro
    50   55   60
Gln Cys Asp Gln Phe Leu Glu Phe Ser Ala Asp Leu Ile Ile Glu Arg
65   70   75   80
Arg Glu Gly Asn Asp Val Cys
                85

<210> 421
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H8

<400> 421
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr Cys Asn Thr Asp Leu Gly Ala
        35   40   45
Pro Leu Glu Leu Arg Asp Cys Lys Ile Glu Ala Val Ile Tyr Gly Asn
    50   55   60
Pro Lys Cys Asp Ile His Leu Lys Asp Gln Gly Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Pro Ser Ala Pro Glu Gly Met Cys
                85   90

<210> 422
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H9

<400> 422
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
 1   5   10   15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
            20   25   30
Leu His Thr Glu His Asn Gly Met Leu Cys Ala Thr Asp Leu Gly His
        35   40   45
Pro Leu Ile Leu Asp Thr Cys Thr Ile Glu Gly Leu Ile Tyr Gly Asn
    50   55   60
Pro Ser Cys Asp Ile Leu Leu Gly Gly Lys Glu Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Ser Ser Ala Val Asn Gly Met Cys
                85   90

<210> 423
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H10

<400> 423

```
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
 1               5                  10                  15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
            20                  25                  30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu Cys Met Lys Gly Arg Ser
        35                  40                  45
Tyr Lys Asp Leu Gly Asn Cys His Pro Val Gly Met Leu Ile Gly Thr
    50                  55                  60
Pro Val Cys Asp Pro His Leu Thr Gly Thr Trp Asp Thr Leu Ile Glu
65                  70                  75                  80
Arg Glu Asn Ala Ile Ala His Cys
                85
```

<210> 424
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H11

<400> 424

```
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1               5                  10                  15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20                  25                  30
Val Glu Thr Glu His Thr Gly Ser Phe Cys Ser Ile Asn Gly Lys Gln
        35                  40                  45
Pro Ile Ser Leu Gly Asp Cys Ser Phe Ala Gly Trp Ile Leu Gly Asn
    50                  55                  60
Pro Met Cys Asp Glu Leu Ile Gly Lys Thr Ser Trp Ser Tyr Ile Val
65                  70                  75                  80
Glu Lys Pro Asn Pro Thr Asn Gly Ile Cys
                85                  90
```

<210> 425
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H12

<400> 425

```
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
 1               5                  10                  15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
            20                  25                  30
Val His Arg Gly Ile Asp Pro Ile Leu Cys Gly Thr Glu Leu Gly Ser
        35                  40                  45
Pro Leu Val Leu Asp Asp Cys Ser Leu Glu Gly Leu Ile Leu Gly Asn
    50                  55                  60
Pro Lys Cys Asp Leu Tyr Leu Asn Gly Arg Glu Trp Ser Tyr Ile Val
65                  70                  75                  80
Glu Arg Pro Lys Glu Met Glu Gly Val Cys
                85                  90
```

<210> 426
<211> 90
<212> PRT

<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H13

<400> 426
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
 1   5   10   15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
            20   25   30
Ile Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Val Ser
        35   40   45
Pro Val His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
    50   55   60
Pro Ala Cys Thr Ser Asn Phe Gly Ile Arg Glu Trp Ser Tyr Leu Ile
65   70   75   80
Glu Asp Pro Ala Ala Pro His Gly Leu Cys
                85   90

<210> 427
<211> 96
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H14

<400> 427
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
 1   5   10   15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
            20   25   30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
        35   40   45
Glu Leu Cys Pro Ser Pro Leu Lys Leu Val Asp Gly Gln Asp Cys His
    50   55   60
Leu Ile Asn Gly Ala Leu Gly Ser Pro Gly Cys Asp Arg Leu Gln Asp
65   70   75   80
Thr Thr Trp Asp Val Phe Ile Glu Arg Pro Thr Ala Val Asp Thr Cys
                85   90   95

<210> 428
<211> 87
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H15

<400> 428
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
 1   5   10   15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20   25   30
Val Glu Ile Thr Gly Ile Asp Lys Val Cys Thr Lys Gly Lys Lys Ala
        35   40   45
Val Asp Leu Gly Ser Cys Gly Ile Leu Gly Thr Ile Ile Gly Pro Pro
    50   55   60
Gln Cys Asp Leu His Leu Glu Phe Lys Ala Asp Leu Ile Ile Glu Arg
65   70   75   80
Arg Asn Ser Ser Asp Ile Cys

85

<210> 429
<211> 90
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H16

<400> 429
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
 1   5   10   15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
            20   25   30
Val Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Ile Ser
        35   40   45
Pro Ile His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
    50   55   60
Pro Ser Cys Ala Thr Asn Ile Asn Ile Arg Glu Trp Ser Tyr Leu Ile
65   70   75   80
Glu Asp Pro Asn Ala Pro Asn Lys Phe Cys
                85   90

<210> 430
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H1

<400> 430
Ala Pro Met Tyr Ala Phe Ala Leu Ser Arg Gly Phe Gly Ser Gly Ile
 1   5   10   15
Ile Thr Ser Asn Ala Ser Met His Glu Cys Asn Thr Lys Cys Gln Thr
            20   25   30
Pro Leu Gly Ala Ile Asn Ser Ser Leu Pro Tyr Gln Asn Ile His Pro
        35   40   45
Val Thr Ile Gly Glu Cys Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg
    50   55   60
Met Val Thr Gly Leu Arg Asn Asn Pro Ser Ile Gln Ser Arg
65   70   75

<210> 431
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H2

<400> 431
Ala Pro Glu Tyr Gly Phe Arg Ile Ser Lys Arg Gly Ser Ser Gly Ile
 1   5   10   15
Met Lys Thr Glu Gly Thr Leu Glu Asn Cys Glu Thr Lys Cys Gln Thr
            20   25   30
Pro Leu Gly Ala Ile Asn Thr Thr Leu Pro Phe His Asn Val His Pro
        35   40   45
Leu Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Arg Leu Val

    50   55   60
Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Ser Arg
65   70   75

<210> 432
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H3

<400> 432
Ala Pro Arg Gly Tyr Phe Lys Met Arg Thr Gly Lys Ser Ser Ile Met
 1   5   10   15
Ser Ser Asp Ala Pro Ile Asp Thr Cys Ile Ser Glu Cys Ile Thr Pro
            20   25   30
Asn Gly Ser Ile Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Ile
        35   40   45
Thr Tyr Gly Ala Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu
    50   55   60
Ala Thr Gly Met Arg Asn Val Pro Glu Lys Gln Thr Arg
65   70   75

<210> 433
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H4

<400> 433
Ala Pro Arg Gly His Tyr Lys Leu Asn Asn Gln Lys Lys Ser Thr Ile
 1   5   10   15
Leu Asn Thr Ala Ile Pro Ile Gly Ser Cys Val Ser Lys Cys His Thr
            20   25   30
Asp Lys Gly Ser Leu Ser Thr Thr Lys Pro Phe Gln Asn Ile Ser Arg
        35   40   45
Ile Ala Val Gly Asp Cys Pro Arg Tyr Val Lys Gln Gly Ser Leu Lys
    50   55   60
Leu Ala Thr Gly Met Arg Asn Ile Pro Glu Lys Ala Ser Arg
65   70   75

<210> 434
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H5

<400> 434
Ala Pro Arg Tyr Ala Tyr Lys Ile Val Lys Lys Gly Asp Ser Ala Ile
 1   5   10   15
Met Lys Ser Gly Leu Ala Tyr Gly Asn Cys Asp Thr Lys Cys Gln Thr
            20   25   30
Pro Val Gly Glu Ile Asn Ser Ser Met Pro Phe His Asn Ile His Pro
        35   40   45
His Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Asp Arg Leu Val

    50   55   60
Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Arg Lys Lys Arg
65   70   75

<210> 435
<211> 79
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H6

<400> 435
Ala Pro Trp Tyr Ala Phe Arg Phe Val Ser Thr Ser Asn Lys Gly Ala
 1   5   10   15
Val Phe Lys Ser Asn Leu Pro Ile Glu Asn Cys Asp Ala Thr Cys Gln
            20   25   30
Thr Val Ala Gly Val Leu Arg Thr Asn Lys Thr Phe Gln Asn Val Ser
        35   40   45
Pro Leu Trp Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Ser Leu
    50   55   60
Arg Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Thr Arg
65   70   75

<210> 436
<211> 81
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H7

<400> 436
Ala Pro Asn Arg Ala Ser Phe Leu Arg Gly Lys Ser Met Gly Ile Gln
 1   5   10   15
Ser Asp Val Gln Val Asp Ala Asn Cys Glu Gly Glu Cys Tyr His Ser
            20   25   30
Gly Gly Thr Ile Thr Ser Arg Leu Pro Phe Gln Asn Ile Asn Ser Arg
        35   40   45
Ala Val Gly Lys Cys Pro Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu
    50   55   60
Ala Thr Gly Met Lys Asn Val Pro Glu Pro Ser Lys Lys Arg Lys Lys
65   70   75   80
Arg

<210> 437
<211> 79
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H8

<400> 437
Ala Pro Glu Phe Gly Tyr Leu Leu Lys Gly Glu Ser Tyr Gly Arg Ile
 1   5   10   15
Ile Gln Asn Glu Asp Ile Pro Ile Gly Asn Cys Asn Thr Lys Cys Gln
            20   25   30
Thr Tyr Ala Gly Ala Ile Asn Ser Ser Lys Pro Phe Gln Asn Ala Ser

35 40 45
Arg His Tyr Met Gly Glu Cys Pro Lys Tyr Val Lys Lys Ala Ser Leu
50 55 60
Arg Leu Ala Val Gly Leu Arg Asn Thr Pro Ser Val Glu Pro Arg
65 70 75

<210> 438
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H9

<400> 438
Ala Pro Trp Tyr Gly His Val Leu Thr Gly Glu Ser His Gly Arg Ile
1 5 10 15
Leu Lys Thr Asp Leu Asn Asn Gly Asn Cys Val Val Gln Cys Gln Thr
20 25 30
Glu Lys Gly Gly Leu Asn Thr Thr Leu Pro Phe His Asn Ile Ser Lys
35 40 45
Tyr Ala Phe Gly Asn Cys Pro Lys Tyr Val Gly Val Lys Ser Leu Lys
50 55 60
Leu Pro Val Gly Leu Arg Asn Val Pro Ala Val Ser Ser Arg
65 70 75

<210> 439
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H10

<400> 439
Ala Pro Ser Arg Val Ser Lys Leu Thr Gly Arg Asp Leu Gly Ile Gln
1 5 10 15
Ser Glu Ala Leu Ile Asp Asn Ser Cys Glu Ser Lys Cys Phe Trp Arg
20 25 30
Gly Gly Ser Ile Asn Thr Lys Leu Pro Phe Gln Asn Leu Ser Pro Arg
35 40 45
Thr Val Gly Gln Cys Pro Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu
50 55 60
Ala Thr Gly Met Arg Asn Val Pro Glu Val Val Gln Gly Arg
65 70 75

<210> 440
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H11

<400> 440
Ala Pro Arg Tyr Ala Phe Glu Ile Val Ser Val Gly Asn Gly Lys Leu
1 5 10 15
Phe Arg Ser Glu Leu Asn Ile Glu Ser Cys Ser Thr Lys Cys Gln Thr
20 25 30
Glu Ile Gly Gly Ile Asn Thr Asn Lys Ser Phe His Asn Val His Arg

        35   40   45
Asn Thr Ile Gly Asp Cys Pro Lys Tyr Val Asn Val Lys Ser Leu Lys
    50   55   60
Leu Ala Thr Gly Pro Arg Asn Val Pro Ala Ile Ala Ser Arg
65   70   75

<210> 441
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H12

<400> 441
Ala Pro Glu Tyr Gly His Leu Ile Thr Gly Lys Ser His Gly Arg Ile
 1   5   10   15
Leu Lys Asn Asn Leu Pro Met Gly Gln Cys Val Thr Glu Cys Gln Leu
            20   25   30
Asn Glu Gly Val Met Asn Thr Ser Lys Pro Phe Gln Asn Thr Ser Lys
        35   40   45
His Tyr Ile Gly Lys Cys Pro Lys Tyr Ile Pro Ser Gly Ser Leu Lys
    50   55   60
Leu Ala Ile Gly Leu Arg Asn Val Pro Gln Val Gln Asp Arg
65   70   75

<210> 442
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H13

<400> 442
Ala Pro Arg Tyr Gly Tyr Ile Ile Glu Glu Tyr Gly Lys Gly Arg Ile
 1   5   10   15
Phe Gln Ser Arg Ile Arg Met Ser Arg Cys Asn Thr Lys Cys Gln Thr
            20   25   30
Ser Val Gly Gly Ile Asn Thr Asn Arg Thr Phe Gln Asn Ile Asp Lys
        35   40   45
Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys
    50   55   60
Leu Ala Thr Gly Leu Arg Asn Val Pro Ala Ile Ser Asn Arg
65   70   75

<210> 443
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H14

<400> 443
Ala Pro Arg Gly His Tyr Lys Ile Ser Lys Ser Thr Lys Ser Thr Val
 1   5   10   15
Leu Lys Ser Asp Lys Arg Ile Gly Ser Cys Thr Ser Pro Cys Leu Thr
            20   25   30
Asp Lys Gly Ser Ile Gln Ser Asp Lys Pro Phe Gln Asn Val Ser Arg

35 40 45
Ile Ala Ile Gly Asn Cys Pro Lys Tyr Val Lys Gln Gly Ser Leu Met
50 55 60
Leu Ala Thr Gly Met Arg Asn Ile Pro Gly Lys Gln Ala Lys
65 70 75

<210> 444
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H15

<400> 444
Ala Pro Asp Arg Ala Thr Phe Leu Arg Ser Asn Ala Pro Ser Gly Ile
1 5 10 15
Glu Tyr Asn Gly Lys Ser Leu Gly Ile Gln Ser Asp Ala Gln Ile Asp
20 25 30
Glu Ser Cys Glu Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser
35 40 45
Pro Leu Pro Phe Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro
50 55 60
Arg Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn
65 70 75 80
Val Pro Glu Lys Ile Arg Thr Arg
85

<210> 445
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H16

<400> 445
Ala Pro Arg Tyr Gly Tyr Ile Ile Glu Lys Tyr Gly Thr Gly Arg Ile
1 5 10 15
Phe Gln Ser Gly Val Arg Met Ala Arg Cys Asn Thr Lys Cys Gln Thr
20 25 30
Ser Leu Gly Gly Ile Asn Thr Asn Lys Thr Phe Gln Asn Ile Glu Arg
35 40 45
Asn Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys
50 55 60
Leu Ala Thr Gly Leu Arg Asn Val Pro Ser Ile Gly Glu Arg
65 70 75

<210> 446
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H1(No Cys, Ala)

<400> 446
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
1 5 10 15

Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Gly Ile Ala
        35   40   45
Pro Leu Gln Leu Gly Lys Cys Asn Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Pro Leu Leu Pro Val Arg Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Thr Pro Asn Ser Glu Asn Gly Ile
                85

<210> 447
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
      subtype H1(No Cys, Ala - Delta 1)

<400> 447
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Gly Ile Ala
        35   40   45
Pro Leu Gln Leu Gly Lys Cys Asn Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Pro Leu Leu Pro Val Arg Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Thr Pro Asn Ser Glu Asn Gly Ile
                85

<210> 448
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
      subtype H1(No Cys, Ala - Delta 3)

<400> 448
Asp Thr Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asp Thr Val Leu Glu Lys Asn Val Thr Val Thr His Ser Val Asn Leu
            20   25   30
Leu Glu Asp Ser His Asn Gly Lys Leu Cys Arg Leu Lys Gly Ile Ala
        35   40   45
Pro Leu Gln Leu Gly Lys Cys Asn Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Pro Leu Leu Pro Val Arg Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Thr Pro Asn Ser Glu Asn Gly
                85

<210> 449
<211> 89
<212> PRT

<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H2(No Cys, Ala)

<400> 449
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
 1   5   10   15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
            20   25   30
Leu Glu Lys Thr His Asn Gly Lys Leu Cys Lys Leu Asn Gly Ile Pro
        35   40   45
Pro Leu Glu Leu Gly Asp Cys Ser Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Arg Leu Leu Thr Val Pro Glu Trp Ser Tyr Ile Met
65   70   75   80
Glu Lys Glu Asn Pro Arg Asn Gly Leu
                85

<210> 450
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H2(No Cys, Ala - Delta 1)

<400> 450
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
 1   5   10   15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
            20   25   30
Leu Glu Lys Thr His Asn Gly Lys Leu Cys Lys Leu Asn Gly Ile Pro
        35   40   45
Pro Leu Glu Leu Gly Asp Cys Ser Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60
Pro Glu Cys Asp Arg Leu Leu Thr Val Pro Glu Trp Ser Tyr Ile Met
65   70   75   80
Glu Lys Glu Asn Pro Arg Asn Gly Leu
                85

<210> 451
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H2(No Cys, Ala - Delta 3)

<400> 451
Asp Gln Ile Cys Ile Gly Tyr His Ser Asn Asn Ser Thr Glu Lys Val
 1   5   10   15
Asp Thr Ile Leu Glu Arg Asn Val Thr Val Thr His Ala Gln Asn Ile
            20   25   30
Leu Glu Lys Thr His Asn Gly Lys Leu Cys Lys Leu Asn Gly Ile Pro
        35   40   45
Pro Leu Glu Leu Gly Asp Cys Ser Ile Ala Gly Trp Leu Leu Gly Asn
    50   55   60

Pro Glu Cys Asp Arg Leu Leu Thr Val Pro Glu Trp Ser Tyr Ile Met
65 70 75 80
Glu Lys Glu Asn Pro Arg Asn Gly
85

<210> 452
<211> 96
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A
HA subtype H3(No Cys, Ala)

<400> 452
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
1 5 10 15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
20 25 30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
35 40 45
Gly Lys Ile Cys Asn Asn Pro His Arg Ile Leu Asp Gly Ile Asp Cys
50 55 60
Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro His Cys Asp Val Phe Gln
65 70 75 80
Asn Glu Thr Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Phe Ser Asn
85 90 95

<210> 453
<211> 96
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H3(No Cys, Ala - Delta 1)

<400> 453
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
1 5 10 15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
20 25 30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
35 40 45
Gly Lys Ile Cys Asn Asn Pro His Arg Ile Leu Asp Gly Ile Asp Cys
50 55 60
Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro His Cys Asp Val Phe Gln
65 70 75 80
Asn Glu Thr Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Phe Ser Asn
85 90 95

<210> 454
<211> 95
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H3(No Cys, Ala - Delta 3)

<400> 454
Gln Asp Leu Pro Gly Asn Asp Asn Ser Thr Ala Thr Leu Cys Leu Gly
 1   5   10   15
His His Ala Val Pro Asn Gly Thr Leu Val Lys Thr Ile Thr Asp Asp
            20   25   30
Gln Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ser Ser Thr
        35   40   45
Gly Lys Ile Cys Asn Asn Pro His Arg Ile Leu Asp Gly Ile Asp Cys
    50   55   60
Thr Leu Ile Asp Ala Leu Leu Gly Asp Pro His Cys Asp Val Phe Gln
65   70   75   80
Asn Glu Thr Trp Asp Leu Phe Val Glu Arg Ser Lys Ala Phe Ser
                85   90   95

<210> 455
<211> 92
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
      subtype H4(No Cys, Ala)

<400> 455
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
 1   5   10   15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
            20   25   30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu Cys
        35   40   45
Pro Ser Pro Leu Arg Leu Val Asp Gly Gln Thr Cys Asp Ile Ile Asn
    50   55   60
Gly Ala Leu Gly Ser Pro Gly Cys Asp His Leu Asn Gly Ala Glu Trp
65   70   75   80
Asp Val Phe Ile Glu Arg Pro Asn Ala Val Asp Thr
                85   90

<210> 456
<211> 92
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
      subtype H4(No Cys, Ala - Delta 1)

<400> 456
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
 1   5   10   15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
            20   25   30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu Cys
        35   40   45
Pro Ser Pro Leu Arg Leu Val Asp Gly Gln Thr Cys Asp Ile Ile Asn
    50   55   60
Gly Ala Leu Gly Ser Pro Gly Cys Asp His Leu Asn Gly Ala Glu Trp
65   70   75   80
Asp Val Phe Ile Glu Arg Pro Asn Ala Val Asp Thr
                85   90

<210> 457
<211> 91
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H4(No Cys, Ala - Delta 3)

<400> 457
Gln Asn Tyr Thr Gly Asn Pro Val Ile Cys Met Gly His His Ala Val
1 5 10 15
Ala Asn Gly Thr Met Val Lys Thr Leu Ala Asp Asp Gln Val Glu Val
20 25 30
Val Thr Ala Gln Glu Leu Val Glu Ser Gln Asn Leu Pro Glu Leu Cys
35 40 45
Pro Ser Pro Leu Arg Leu Val Asp Gly Gln Thr Cys Asp Ile Ile Asn
50 55 60
Gly Ala Leu Gly Ser Pro Gly Cys Asp His Leu Asn Gly Ala Glu Trp
65 70 75 80
Asp Val Phe Ile Glu Arg Pro Asn Ala Val Asp
85 90

<210> 458
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H5(No Cys, Ala)

<400> 458
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
1 5 10 15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
20 25 30
Leu Glu Arg Thr His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Lys
35 40 45
Pro Leu Ile Leu Arg Asp Cys Ser Val Ala Gly Trp Leu Leu Gly Asn
50 55 60
Pro Met Cys Asp Glu Phe Leu Asn Leu Pro Glu Trp Leu Tyr Ile Val
65 70 75 80
Glu Lys Asp Asn Pro Ile Asn Ser Leu
85

<210> 459
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H5(No Cys, Ala - Delta 1)

<400> 459
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
1 5 10 15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
20 25 30
Leu Glu Arg Thr His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Lys

```
        35                  40                  45
Pro Leu Ile Leu Arg Asp Cys Ser Val Ala Gly Trp Leu Leu Gly Asn
    50                  55                  60
Pro Met Cys Asp Glu Phe Leu Asn Leu Pro Glu Trp Leu Tyr Ile Val
65                  70                  75                  80
Glu Lys Asp Asn Pro Ile Asn Ser Leu
                85
```

<210> 460
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H5(No Cys, Ala - Delta 3)

<400> 460

```
Asp Gln Ile Cys Ile Gly Tyr His Ala Asn Lys Ser Thr Lys Gln Val
 1               5                  10                  15
Asp Thr Ile Met Glu Lys Asn Val Thr Val Thr His Ala Gln Asp Ile
            20                  25                  30
Leu Glu Arg Thr His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Lys
        35                  40                  45
Pro Leu Ile Leu Arg Asp Cys Ser Val Ala Gly Trp Leu Leu Gly Asn
    50                  55                  60
Pro Met Cys Asp Glu Phe Leu Asn Leu Pro Glu Trp Leu Tyr Ile Val
65                  70                  75                  80
Glu Lys Asp Asn Pro Ile Asn Ser
                85
```

<210> 461
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H6(No Cys, Ala)

<400> 461

```
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
 1               5                  10                  15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
            20                  25                  30
Leu Glu Asn Gln Lys Glu Glu Arg Phe Cys Lys Ile Leu Lys Lys Ala
        35                  40                  45
Pro Leu Asp Leu Lys Gly Cys Thr Ile Glu Gly Trp Ile Leu Gly Asn
    50                  55                  60
Pro Gln Cys Asp Leu Leu Leu Gly Asp Gln Ser Trp Ser Tyr Ile Val
65                  70                  75                  80
Glu Arg Pro Thr Ala Gln Asn Gly Ile
                85
```

<210> 462
<211> 89
<212> PRT
<213> Influenza virus A

<220>

<223> N-termianl long stem domain segment of Influenza A HA
subtype H6(No Cys, Ala - Delta 1)

<400> 462
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
1 5 10 15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
20 25 30
Leu Glu Asn Gln Lys Glu Glu Arg Phe Cys Lys Ile Leu Lys Lys Ala
35 40 45
Pro Leu Asp Leu Lys Gly Cys Thr Ile Glu Gly Trp Ile Leu Gly Asn
50 55 60
Pro Gln Cys Asp Leu Leu Leu Gly Asp Gln Ser Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Pro Thr Ala Gln Asn Gly Ile
85

<210> 463
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H6(No Cys, Ala - Delta 3)

<400> 463
Asp Lys Ile Cys Ile Gly Tyr His Ala Asn Asn Ser Thr Thr Gln Ile
1 5 10 15
Asp Thr Ile Leu Glu Lys Asn Val Thr Val Thr His Ser Val Glu Leu
20 25 30
Leu Glu Asn Gln Lys Glu Glu Arg Phe Cys Lys Ile Leu Lys Lys Ala
35 40 45
Pro Leu Asp Leu Lys Gly Cys Thr Ile Glu Gly Trp Ile Leu Gly Asn
50 55 60
Pro Gln Cys Asp Leu Leu Leu Gly Asp Gln Ser Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Pro Thr Ala Gln Asn Gly
85

<210> 464
<211> 86
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H7(No Cys, Ala)

<400> 464
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Arg Thr Asn Ile Pro Lys Ile Cys Ser Lys Gly Lys Arg Thr
35 40 45
Thr Asp Leu Gly Gln Cys Gly Leu Leu Gly Thr Ile Thr Gly Pro Pro
50 55 60
Gln Cys Asp Gln Phe Leu Glu Phe Ser Ala Asp Leu Ile Ile Glu Arg
65 70 75 80
Arg Glu Gly Asn Asp Val

85

<210> 465
<211> 86
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H7(No Cys, Ala - Delta 1)

<400> 465
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Arg Thr Asn Ile Pro Lys Ile Cys Ser Lys Gly Lys Arg Thr
35 40 45
Thr Asp Leu Gly Gln Cys Gly Leu Leu Gly Thr Ile Thr Gly Pro Pro
50 55 60
Gln Cys Asp Gln Phe Leu Glu Phe Ser Ala Asp Leu Ile Ile Glu Arg
65 70 75 80
Arg Glu Gly Asn Asp Val
85

<210> 466
<211> 85
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H7(No Cys, Ala - Delta 3)

<400> 466
Asp Lys Ile Cys Leu Gly His His Ala Val Ser Asn Gly Thr Lys Val
1 5 10 15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
20 25 30
Val Glu Arg Thr Asn Ile Pro Lys Ile Cys Ser Lys Gly Lys Arg Thr
35 40 45
Thr Asp Leu Gly Gln Cys Gly Leu Leu Gly Thr Ile Thr Gly Pro Pro
50 55 60
Gln Cys Asp Gln Phe Leu Glu Phe Ser Ala Asp Leu Ile Ile Glu Arg
65 70 75 80
Arg Glu Gly Asn Asp
85

<210> 467
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H8(No Cys, Ala)

<400> 467
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
1 5 10 15

Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr Cys Asn Thr Asp Leu Gly Ala
        35   40   45
Pro Leu Glu Leu Arg Asp Cys Lys Ile Glu Ala Val Ile Tyr Gly Asn
    50   55   60
Pro Lys Cys Asp Ile His Leu Lys Asp Gln Gly Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Pro Ser Ala Pro Glu Gly Met
                85

<210> 468
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
      H8(No Cys, Ala - Delta 1)

<400> 468
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr Cys Asn Thr Asp Leu Gly Ala
        35   40   45
Pro Leu Glu Leu Arg Asp Cys Lys Ile Glu Ala Val Ile Tyr Gly Asn
    50   55   60
Pro Lys Cys Asp Ile His Leu Lys Asp Gln Gly Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Pro Ser Ala Pro Glu Gly Met
                85

<210> 469
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
      H8(No Cys, Ala - Delta 3)

<400> 469
Asp Arg Ile Cys Ile Gly Tyr Gln Ser Asn Asn Ser Thr Asp Thr Val
 1   5   10   15
Asn Thr Leu Ile Glu Gln Asn Val Pro Val Thr Gln Thr Met Glu Leu
            20   25   30
Val Glu Thr Glu Lys His Pro Ala Tyr Cys Asn Thr Asp Leu Gly Ala
        35   40   45
Pro Leu Glu Leu Arg Asp Cys Lys Ile Glu Ala Val Ile Tyr Gly Asn
    50   55   60
Pro Lys Cys Asp Ile His Leu Lys Asp Gln Gly Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Pro Ser Ala Pro Glu Gly
                85

<210> 470
<211> 89
<212> PRT

<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
H9(No Cys, Ala)

<400> 470
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
20 25 30
Leu His Thr Glu His Asn Gly Met Leu Cys Ala Thr Asp Leu Gly His
35 40 45
Pro Leu Ile Leu Asp Thr Cys Thr Ile Glu Gly Leu Ile Tyr Gly Asn
50 55 60
Pro Ser Cys Asp Ile Leu Leu Gly Gly Lys Glu Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Ser Ser Ala Val Asn Gly Met
85

<210> 471
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
H9(No Cys, Ala - Delta 1)

<400> 471
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
20 25 30
Leu His Thr Glu His Asn Gly Met Leu Cys Ala Thr Asp Leu Gly His
35 40 45
Pro Leu Ile Leu Asp Thr Cys Thr Ile Glu Gly Leu Ile Tyr Gly Asn
50 55 60
Pro Ser Cys Asp Ile Leu Leu Gly Gly Lys Glu Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Ser Ser Ala Val Asn Gly Met
85

<210> 472
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
H9(No Cys, Ala - Delta 3)

<400> 472
Asp Lys Ile Cys Ile Gly Tyr Gln Ser Thr Asn Ser Thr Glu Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Ser Asn Val Pro Val Thr His Thr Lys Glu Leu
20 25 30
Leu His Thr Glu His Asn Gly Met Leu Cys Ala Thr Asp Leu Gly His
35 40 45
Pro Leu Ile Leu Asp Thr Cys Thr Ile Glu Gly Leu Ile Tyr Gly Asn
50 55 60

Pro Ser Cys Asp Ile Leu Leu Gly Gly Lys Glu Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Ser Ser Ala Val Asn Gly
85

<210> 473
<211> 87
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H10(No Cys, Ala)

<400> 473
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
1 5 10 15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
20 25 30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu Cys Met Lys Gly Arg Ser
35 40 45
Tyr Lys Asp Leu Gly Asn Cys His Pro Val Gly Met Leu Ile Gly Thr
50 55 60
Pro Val Cys Asp Pro His Leu Thr Gly Thr Trp Asp Thr Leu Ile Glu
65 70 75 80
Arg Glu Asn Ala Ile Ala His
85

<210> 474
<211> 87
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H10(No Cys, Ala - Delta 1)

<400> 474
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
1 5 10 15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
20 25 30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu Cys Met Lys Gly Arg Ser
35 40 45
Tyr Lys Asp Leu Gly Asn Cys His Pro Val Gly Met Leu Ile Gly Thr
50 55 60
Pro Val Cys Asp Pro His Leu Thr Gly Thr Trp Asp Thr Leu Ile Glu
65 70 75 80
Arg Glu Asn Ala Ile Ala His
85

<210> 475
<211> 86
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H10(No Cys, Ala - Delta 3)

<400> 475
Leu Asp Arg Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Ile
 1   5   10   15
Val Lys Thr Leu Thr Asn Glu Gln Glu Glu Val Thr Asn Ala Thr Glu
            20   25   30
Thr Val Glu Ser Thr Asn Leu Asn Lys Leu Cys Met Lys Gly Arg Ser
        35   40   45
Tyr Lys Asp Leu Gly Asn Cys His Pro Val Gly Met Leu Ile Gly Thr
    50   55   60
Pro Val Cys Asp Pro His Leu Thr Gly Thr Trp Asp Thr Leu Ile Glu
65   70   75   80
Arg Glu Asn Ala Ile Ala
                85

<210> 476
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
      H11(No Cys, Ala)

<400> 476
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1   5   10   15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20   25   30
Val Glu Thr Glu His Thr Gly Ser Phe Cys Ser Ile Asn Gly Lys Gln
        35   40   45
Pro Ile Ser Leu Gly Asp Cys Ser Phe Ala Gly Trp Ile Leu Gly Asn
    50   55   60
Pro Met Cys Asp Glu Leu Ile Gly Lys Thr Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Lys Pro Asn Pro Thr Asn Gly Ile
                85

<210> 477
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype
      H11(No Cys, Ala - Delta 1)

<400> 477
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1   5   10   15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20   25   30
Val Glu Thr Glu His Thr Gly Ser Phe Cys Ser Ile Asn Gly Lys Gln
        35   40   45
Pro Ile Ser Leu Gly Asp Cys Ser Phe Ala Gly Trp Ile Leu Gly Asn
    50   55   60
Pro Met Cys Asp Glu Leu Ile Gly Lys Thr Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Lys Pro Asn Pro Thr Asn Gly Ile
                85

<210> 478
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H11(No Cys, Ala - Delta 3)

<400> 478
Asp Glu Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Thr Asp Lys Val
 1   5   10   15
Asp Thr Ile Ile Glu Asn Asn Val Thr Val Thr Ser Ser Val Glu Leu
            20   25   30
Val Glu Thr Glu His Thr Gly Ser Phe Cys Ser Ile Asn Gly Lys Gln
        35   40   45
Pro Ile Ser Leu Gly Asp Cys Ser Phe Ala Gly Trp Ile Leu Gly Asn
    50   55   60
Pro Met Cys Asp Glu Leu Ile Gly Lys Thr Ser Trp Ser Tyr Ile Val
65   70   75   80
Glu Lys Pro Asn Pro Thr Asn Gly
                85

<210> 479
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H12(No Cys, Ala)

<400> 479
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
 1   5   10   15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
            20   25   30
Val His Arg Gly Ile Asp Pro Ile Leu Cys Gly Thr Glu Leu Gly Ser
        35   40   45
Pro Leu Val Leu Asp Asp Cys Ser Leu Glu Gly Leu Ile Leu Gly Asn
    50   55   60
Pro Lys Cys Asp Leu Tyr Leu Asn Gly Arg Glu Trp Ser Tyr Ile Val
65   70   75   80
Glu Arg Pro Lys Glu Met Glu Gly Val
                85

<210> 480
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H12(No Cys, Ala - Delta 1)

<400> 480
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
 1   5   10   15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
            20   25   30
Val His Arg Gly Ile Asp Pro Ile Leu Cys Gly Thr Glu Leu Gly Ser

35 40 45
Pro Leu Val Leu Asp Asp Cys Ser Leu Glu Gly Leu Ile Leu Gly Asn
50 55 60
Pro Lys Cys Asp Leu Tyr Leu Asn Gly Arg Glu Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Pro Lys Glu Met Glu Gly Val
85

<210> 481
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H12(No Cys, Ala - Delta 3)

<400> 481
Asp Lys Ile Cys Ile Gly Tyr Gln Thr Asn Asn Ser Thr Glu Thr Val
1 5 10 15
Asn Thr Leu Ser Glu Gln Asn Val Pro Val Thr Gln Val Glu Glu Leu
20 25 30
Val His Arg Gly Ile Asp Pro Ile Leu Cys Gly Thr Glu Leu Gly Ser
35 40 45
Pro Leu Val Leu Asp Asp Cys Ser Leu Glu Gly Leu Ile Leu Gly Asn
50 55 60
Pro Lys Cys Asp Leu Tyr Leu Asn Gly Arg Glu Trp Ser Tyr Ile Val
65 70 75 80
Glu Arg Pro Lys Glu Met Glu Gly
85

<210> 482
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H13(No Cys, Ala)

<400> 482
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
1 5 10 15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
20 25 30
Ile Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Val Ser
35 40 45
Pro Val His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
50 55 60
Pro Ala Cys Thr Ser Asn Phe Gly Ile Arg Glu Trp Ser Tyr Leu Ile
65 70 75 80
Glu Asp Pro Ala Ala Pro His Gly Leu
85

<210> 483
<211> 89
<212> PRT
<213> Influenza virus A

<220>

<223> N-termianl long stem domain segment of Influenza A HA
subtype H13(No Cys, Ala - Delta 1)

<400> 483
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
1 5 10 15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
20 25 30
Ile Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Val Ser
35 40 45
Pro Val His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
50 55 60
Pro Ala Cys Thr Ser Asn Phe Gly Ile Arg Glu Trp Ser Tyr Leu Ile
65 70 75 80
Glu Asp Pro Ala Ala Pro His Gly Leu
85

<210> 484
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H13(No Cys, Ala - Delta 3)

<400> 484
Asp Arg Ile Cys Val Gly Tyr Leu Ser Thr Asn Ser Ser Glu Arg Val
1 5 10 15
Asp Thr Leu Leu Glu Asn Gly Val Pro Val Thr Ser Ser Ile Asp Leu
20 25 30
Ile Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Val Ser
35 40 45
Pro Val His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
50 55 60
Pro Ala Cys Thr Ser Asn Phe Gly Ile Arg Glu Trp Ser Tyr Leu Ile
65 70 75 80
Glu Asp Pro Ala Ala Pro His Gly
85

<210> 485
<211> 95
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H14(No Cys, Ala)

<400> 485
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
1 5 10 15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
20 25 30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
35 40 45
Glu Leu Cys Pro Ser Pro Leu Lys Leu Val Asp Gly Gln Asp Cys His
50 55 60
Leu Ile Asn Gly Ala Leu Gly Ser Pro Gly Cys Asp Arg Leu Gln Asp
65 70 75 80
Thr Thr Trp Asp Val Phe Ile Glu Arg Pro Thr Ala Val Asp Thr

85 90 95

<210> 486
<211> 95
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H14(No Cys, Ala - Delta 1)

<400> 486
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
1 5 10 15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
20 25 30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
35 40 45
Glu Leu Cys Pro Ser Pro Leu Lys Leu Val Asp Gly Gln Asp Cys His
50 55 60
Leu Ile Asn Gly Ala Leu Gly Ser Pro Gly Cys Asp Arg Leu Gln Asp
65 70 75 80
Thr Thr Trp Asp Val Phe Ile Glu Arg Pro Thr Ala Val Asp Thr
85 90 95

<210> 487
<211> 94
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H14(No Cys, Ala - Delta 3)

<400> 487
Gln Ile Thr Asn Gly Thr Thr Gly Asn Pro Ile Ile Cys Leu Gly His
1 5 10 15
His Ala Val Glu Asn Gly Thr Ser Val Lys Thr Leu Thr Asp Asn His
20 25 30
Val Glu Val Val Ser Ala Lys Glu Leu Val Glu Thr Asn His Thr Asp
35 40 45
Glu Leu Cys Pro Ser Pro Leu Lys Leu Val Asp Gly Gln Asp Cys His
50 55 60
Leu Ile Asn Gly Ala Leu Gly Ser Pro Gly Cys Asp Arg Leu Gln Asp
65 70 75 80
Thr Thr Trp Asp Val Phe Ile Glu Arg Pro Thr Ala Val Asp
85 90

<210> 488
<211> 86
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA subtype H15(No Cys, Ala)

<400> 488
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
1 5 10 15

Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20   25   30
Val Glu Ile Thr Gly Ile Asp Lys Val Cys Thr Lys Gly Lys Lys Ala
        35   40   45
Val Asp Leu Gly Ser Cys Gly Ile Leu Gly Thr Ile Ile Gly Pro Pro
    50   55   60
Gln Cys Asp Leu His Leu Glu Phe Lys Ala Asp Leu Ile Ile Glu Arg
65   70   75   80
Arg Asn Ser Ser Asp Ile
                85

<210> 489
<211> 86
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
      subtype H15(No Cys, Ala - Delta 1)

<400> 489
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
 1   5   10   15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20   25   30
Val Glu Ile Thr Gly Ile Asp Lys Val Cys Thr Lys Gly Lys Lys Ala
        35   40   45
Val Asp Leu Gly Ser Cys Gly Ile Leu Gly Thr Ile Ile Gly Pro Pro
    50   55   60
Gln Cys Asp Leu His Leu Glu Phe Lys Ala Asp Leu Ile Ile Glu Arg
65   70   75   80
Arg Asn Ser Ser Asp Ile
                85

<210> 490
<211> 85
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
      subtype H15(No Cys, Ala - Delta 3)

<400> 490
Asp Lys Ile Cys Leu Gly His His Ala Val Ala Asn Gly Thr Lys Val
 1   5   10   15
Asn Thr Leu Thr Glu Arg Gly Val Glu Val Val Asn Ala Thr Glu Thr
            20   25   30
Val Glu Ile Thr Gly Ile Asp Lys Val Cys Thr Lys Gly Lys Lys Ala
        35   40   45
Val Asp Leu Gly Ser Cys Gly Ile Leu Gly Thr Ile Ile Gly Pro Pro
    50   55   60
Gln Cys Asp Leu His Leu Glu Phe Lys Ala Asp Leu Ile Ile Glu Arg
65   70   75   80
Arg Asn Ser Ser Asp
                85

<210> 491
<211> 89
<212> PRT

<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H16(No Cys, Ala)

<400> 491
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
20 25 30
Val Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Ile Ser
35 40 45
Pro Ile His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
50 55 60
Pro Ser Cys Ala Thr Asn Ile Asn Ile Arg Glu Trp Ser Tyr Leu Ile
65 70 75 80
Glu Asp Pro Asn Ala Pro Asn Lys Phe
85

<210> 492
<211> 89
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H16(No Cys, Ala - Delta 1)

<400> 492
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
20 25 30
Val Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Ile Ser
35 40 45
Pro Ile His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
50 55 60
Pro Ser Cys Ala Thr Asn Ile Asn Ile Arg Glu Trp Ser Tyr Leu Ile
65 70 75 80
Glu Asp Pro Asn Ala Pro Asn Lys Phe
85

<210> 493
<211> 88
<212> PRT
<213> Influenza virus A

<220>
<223> N-termianl long stem domain segment of Influenza A HA
subtype H16(No Cys, Ala - Delta 3)

<400> 493
Asp Lys Ile Cys Ile Gly Tyr Leu Ser Asn Asn Ser Ser Asp Thr Val
1 5 10 15
Asp Thr Leu Thr Glu Asn Gly Val Pro Val Thr Ser Ser Val Asp Leu
20 25 30
Val Glu Thr Asn His Thr Gly Thr Tyr Cys Ser Leu Asn Gly Ile Ser
35 40 45
Pro Ile His Leu Gly Asp Cys Ser Phe Glu Gly Trp Ile Val Gly Asn
50 55 60

Pro Ser Cys Ala Thr Asn Ile Asn Ile Arg Glu Trp Ser Tyr Leu Ile
65 70 75 80
Glu Asp Pro Asn Ala Pro Asn Lys
85

<210> 494
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H1(No Cys, Ala)

<400> 494
Pro Met Tyr Ala Phe Ala Leu Ser Arg Gly Phe Gly Ser Gly Ile Ile
1 5 10 15
Thr Ser Asn Ala Ser Met His Glu Cys Asn Thr Lys Cys Gln Thr Pro
20 25 30
Leu Gly Ala Ile Asn Ser Ser Leu Pro Tyr Gln Asn Ile His Pro Val
35 40 45
Thr Ile Gly Glu Cys Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg Met
50 55 60
Val Thr Gly Leu Arg Asn Asn Pro Ser Ile Gln Ser Arg
65 70 75

<210> 495
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H1(No Cys, Ala - Delta 1)

<400> 495
Met Tyr Ala Phe Ala Leu Ser Arg Gly Phe Gly Ser Gly Ile Ile Thr
1 5 10 15
Ser Asn Ala Ser Met His Glu Cys Asn Thr Lys Cys Gln Thr Pro Leu
20 25 30
Gly Ala Ile Asn Ser Ser Leu Pro Tyr Gln Asn Ile His Pro Val Thr
35 40 45
Ile Gly Glu Cys Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val
50 55 60
Thr Gly Leu Arg Asn Asn Pro Ser Ile Gln Ser Arg
65 70 75

<210> 496
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H1(No Cys, Ala - Delta 3)

<400> 496
Tyr Ala Phe Ala Leu Ser Arg Gly Phe Gly Ser Gly Ile Ile Thr Ser
1 5 10 15
Asn Ala Ser Met His Glu Cys Asn Thr Lys Cys Gln Thr Pro Leu Gly

            20   25   30
Ala Ile Asn Ser Ser Leu Pro Tyr Gln Asn Ile His Pro Val Thr Ile
        35   40   45
Gly Glu Cys Pro Lys Tyr Val Arg Ser Ala Lys Leu Arg Met Val Thr
    50   55   60
Gly Leu Arg Asn Asn Pro Ser Ile Gln Ser Arg
65   70   75

<210> 497
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H2(No Cys, Ala)

<400> 497
Pro Glu Tyr Gly Phe Arg Ile Ser Lys Arg Gly Ser Ser Gly Ile Met
 1   5   10   15
Lys Thr Glu Gly Thr Leu Glu Asn Cys Glu Thr Lys Cys Gln Thr Pro
            20   25   30
Leu Gly Ala Ile Asn Thr Thr Leu Pro Phe His Asn Val His Pro Leu
        35   40   45
Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Arg Leu Val Leu
    50   55   60
Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Ser Arg
65   70   75

<210> 498
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H2(No Cys, Ala - Delta 1)

<400> 498
Glu Tyr Gly Phe Arg Ile Ser Lys Arg Gly Ser Ser Gly Ile Met Lys
 1   5   10   15
Thr Glu Gly Thr Leu Glu Asn Cys Glu Thr Lys Cys Gln Thr Pro Leu
            20   25   30
Gly Ala Ile Asn Thr Thr Leu Pro Phe His Asn Val His Pro Leu Thr
        35   40   45
Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Arg Leu Val Leu Ala
    50   55   60
Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Ser Arg
65   70   75

<210> 499
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H2(No Cys, Ala - Delta 3)

<400> 499

Tyr Gly Phe Arg Ile Ser Lys Arg Gly Ser Ser Gly Ile Met Lys Thr
 1   5   10   15
Glu Gly Thr Leu Glu Asn Cys Glu Thr Lys Cys Gln Thr Pro Leu Gly
            20   25   30
Ala Ile Asn Thr Thr Leu Pro Phe His Asn Val His Pro Leu Thr Ile
        35   40   45
Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Arg Leu Val Leu Ala Thr
    50   55   60
Gly Leu Arg Asn Val Pro Gln Ile Glu Ser Arg
65   70   75

<210> 500
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H3(No Cys, Ala)

<400> 500
Pro Arg Gly Tyr Phe Lys Met Arg Thr Gly Lys Ser Ser Ile Met Ser
 1   5   10   15
Ser Asp Ala Pro Ile Asp Thr Cys Ile Ser Glu Cys Ile Thr Pro Asn
            20   25   30
Gly Ser Ile Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Ile Thr
        35   40   45
Tyr Gly Ala Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala
    50   55   60
Thr Gly Met Arg Asn Val Pro Glu Lys Gln Thr Arg
65   70   75

<210> 501
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H3(No Cys, Ala - Delta 1)

<400> 501
Arg Gly Tyr Phe Lys Met Arg Thr Gly Lys Ser Ser Ile Met Ser Ser
 1   5   10   15
Asp Ala Pro Ile Asp Thr Cys Ile Ser Glu Cys Ile Thr Pro Asn Gly
            20   25   30
Ser Ile Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Ile Thr Tyr
        35   40   45
Gly Ala Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr
    50   55   60
Gly Met Arg Asn Val Pro Glu Lys Gln Thr Arg
65   70   75

<210> 502
<211> 74
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA

subtype H3(No Cys, Ala - Delta 3)

<400> 502
Gly Tyr Phe Lys Met Arg Thr Gly Lys Ser Ser Ile Met Ser Ser Asp
 1   5   10   15
Ala Pro Ile Asp Thr Cys Ile Ser Glu Cys Ile Thr Pro Asn Gly Ser
            20   25   30
Ile Pro Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Ile Thr Tyr Gly
        35   40   45
Ala Cys Pro Lys Tyr Val Lys Gln Asn Thr Leu Lys Leu Ala Thr Gly
    50   55   60
Met Arg Asn Val Pro Glu Lys Gln Thr Arg
65   70

<210> 503
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H4(No Cys, Ala)

<400> 503
Pro Arg Gly His Tyr Lys Leu Asn Asn Gln Lys Lys Ser Thr Ile Leu
 1   5   10   15
Asn Thr Ala Ile Pro Ile Gly Ser Cys Val Ser Lys Cys His Thr Asp
            20   25   30
Lys Gly Ser Leu Ser Thr Thr Lys Pro Phe Gln Asn Ile Ser Arg Ile
        35   40   45
Ala Val Gly Asp Cys Pro Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu
    50   55   60
Ala Thr Gly Met Arg Asn Ile Pro Glu Lys Ala Ser Arg
65   70   75

<210> 504
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H4(No Cys, Ala - Delta 1)

<400> 504
Arg Gly His Tyr Lys Leu Asn Asn Gln Lys Lys Ser Thr Ile Leu Asn
 1   5   10   15
Thr Ala Ile Pro Ile Gly Ser Cys Val Ser Lys Cys His Thr Asp Lys
            20   25   30
Gly Ser Leu Ser Thr Thr Lys Pro Phe Gln Asn Ile Ser Arg Ile Ala
        35   40   45
Val Gly Asp Cys Pro Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala
    50   55   60
Thr Gly Met Arg Asn Ile Pro Glu Lys Ala Ser Arg
65   70   75

<210> 505
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H4(No Cys, Ala - Delta 3)

<400> 505
Gly His Tyr Lys Leu Asn Asn Gln Lys Lys Ser Thr Ile Leu Asn Thr
1 5 10 15
Ala Ile Pro Ile Gly Ser Cys Val Ser Lys Cys His Thr Asp Lys Gly
20 25 30
Ser Leu Ser Thr Thr Lys Pro Phe Gln Asn Ile Ser Arg Ile Ala Val
35 40 45
Gly Asp Cys Pro Arg Tyr Val Lys Gln Gly Ser Leu Lys Leu Ala Thr
50 55 60
Gly Met Arg Asn Ile Pro Glu Lys Ala Ser Arg
65 70 75

<210> 506
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H5(No Cys, Ala)

<400> 506
Pro Arg Tyr Ala Tyr Lys Ile Val Lys Lys Gly Asp Ser Ala Ile Met
1 5 10 15
Lys Ser Gly Leu Ala Tyr Gly Asn Cys Asp Thr Lys Cys Gln Thr Pro
20 25 30
Val Gly Glu Ile Asn Ser Ser Met Pro Phe His Asn Ile His Pro His
35 40 45
Thr Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Asp Arg Leu Val Leu
50 55 60
Ala Thr Gly Leu Arg Asn Val Pro Gln Arg Lys Lys Arg
65 70 75

<210> 507
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H5(No Cys, Ala - Delta 1)

<400> 507
Arg Tyr Ala Tyr Lys Ile Val Lys Lys Gly Asp Ser Ala Ile Met Lys
1 5 10 15
Ser Gly Leu Ala Tyr Gly Asn Cys Asp Thr Lys Cys Gln Thr Pro Val
20 25 30
Gly Glu Ile Asn Ser Ser Met Pro Phe His Asn Ile His Pro His Thr
35 40 45
Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Asp Arg Leu Val Leu Ala
50 55 60
Thr Gly Leu Arg Asn Val Pro Gln Arg Lys Lys Arg
65 70 75

<210> 508

<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H5(No Cys, Ala - Delta 3)

<400> 508
Tyr Ala Tyr Lys Ile Val Lys Lys Gly Asp Ser Ala Ile Met Lys Ser
1 5 10 15
Gly Leu Ala Tyr Gly Asn Cys Asp Thr Lys Cys Gln Thr Pro Val Gly
20 25 30
Glu Ile Asn Ser Ser Met Pro Phe His Asn Ile His Pro His Thr Ile
35 40 45
Gly Glu Cys Pro Lys Tyr Val Lys Ser Asp Arg Leu Val Leu Ala Thr
50 55 60
Gly Leu Arg Asn Val Pro Gln Arg Lys Lys Arg
65 70 75

<210> 509
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H6(No Cys, Ala)

<400> 509
Pro Trp Tyr Ala Phe Arg Phe Val Ser Thr Ser Asn Lys Gly Ala Val
1 5 10 15
Phe Lys Ser Asn Leu Pro Ile Glu Asn Cys Asp Ala Thr Cys Gln Thr
20 25 30
Val Ala Gly Val Leu Arg Thr Asn Lys Thr Phe Gln Asn Val Ser Pro
35 40 45
Leu Trp Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Ser Leu Arg
50 55 60
Leu Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Thr Arg
65 70 75

<210> 510
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H6(No Cys, Ala - Delta 1)

<400> 510
Trp Tyr Ala Phe Arg Phe Val Ser Thr Ser Asn Lys Gly Ala Val Phe
1 5 10 15
Lys Ser Asn Leu Pro Ile Glu Asn Cys Asp Ala Thr Cys Gln Thr Val
20 25 30
Ala Gly Val Leu Arg Thr Asn Lys Thr Phe Gln Asn Val Ser Pro Leu
35 40 45
Trp Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Ser Leu Arg Leu
50 55 60
Ala Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Thr Arg
65 70 75

<210> 511
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H6(No Cys, Ala - Delta 3)

<400> 511
Tyr Ala Phe Arg Phe Val Ser Thr Ser Asn Lys Gly Ala Val Phe Lys
1 5 10 15
Ser Asn Leu Pro Ile Glu Asn Cys Asp Ala Thr Cys Gln Thr Val Ala
20 25 30
Gly Val Leu Arg Thr Asn Lys Thr Phe Gln Asn Val Ser Pro Leu Trp
35 40 45
Ile Gly Glu Cys Pro Lys Tyr Val Lys Ser Glu Ser Leu Arg Leu Ala
50 55 60
Thr Gly Leu Arg Asn Val Pro Gln Ile Glu Thr Arg
65 70 75

<210> 512
<211> 80
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H7(No Cys, Ala)

<400> 512
Pro Asn Arg Ala Ser Phe Leu Arg Gly Lys Ser Met Gly Ile Gln Ser
1 5 10 15
Asp Val Gln Val Asp Ala Asn Cys Glu Gly Glu Cys Tyr His Ser Gly
20 25 30
Gly Thr Ile Thr Ser Arg Leu Pro Phe Gln Asn Ile Asn Ser Arg Ala
35 40 45
Val Gly Lys Cys Pro Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala
50 55 60
Thr Gly Met Lys Asn Val Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
65 70 75 80

<210> 513
<211> 79
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H7(No Cys, Ala - Delta 1)

<400> 513
Asn Arg Ala Ser Phe Leu Arg Gly Lys Ser Met Gly Ile Gln Ser Asp
1 5 10 15
Val Gln Val Asp Ala Asn Cys Glu Gly Glu Cys Tyr His Ser Gly Gly
20 25 30
Thr Ile Thr Ser Arg Leu Pro Phe Gln Asn Ile Asn Ser Arg Ala Val
35 40 45
Gly Lys Cys Pro Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala Thr

    50   55   60
Gly Met Lys Asn Val Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
65   70   75

<210> 514
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H7(No Cys, Ala - Delta 3)

<400> 514
Arg Ala Ser Phe Leu Arg Gly Lys Ser Met Gly Ile Gln Ser Asp Val
 1   5   10   15
Gln Val Asp Ala Asn Cys Glu Gly Glu Cys Tyr His Ser Gly Gly Thr
            20   25   30
Ile Thr Ser Arg Leu Pro Phe Gln Asn Ile Asn Ser Arg Ala Val Gly
        35   40   45
Lys Cys Pro Arg Tyr Val Lys Gln Glu Ser Leu Leu Leu Ala Thr Gly
    50   55   60
Met Lys Asn Val Pro Glu Pro Ser Lys Lys Arg Lys Lys Arg
65   70   75

<210> 515
<211> 78
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H8(No Cys, Ala)

<400> 515
Pro Glu Phe Gly Tyr Leu Leu Lys Gly Glu Ser Tyr Gly Arg Ile Ile
 1   5   10   15
Gln Asn Glu Asp Ile Pro Ile Gly Asn Cys Asn Thr Lys Cys Gln Thr
            20   25   30
Tyr Ala Gly Ala Ile Asn Ser Ser Lys Pro Phe Gln Asn Ala Ser Arg
        35   40   45
His Tyr Met Gly Glu Cys Pro Lys Tyr Val Lys Lys Ala Ser Leu Arg
    50   55   60
Leu Ala Val Gly Leu Arg Asn Thr Pro Ser Val Glu Pro Arg
65   70   75

<210> 516
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H8(No Cys, Ala - Delta 1)

<400> 516
Glu Phe Gly Tyr Leu Leu Lys Gly Glu Ser Tyr Gly Arg Ile Ile Gln
 1   5   10   15
Asn Glu Asp Ile Pro Ile Gly Asn Cys Asn Thr Lys Cys Gln Thr Tyr
            20   25   30

Ala Gly Ala Ile Asn Ser Ser Lys Pro Phe Gln Asn Ala Ser Arg His
        35   40   45
Tyr Met Gly Glu Cys Pro Lys Tyr Val Lys Lys Ala Ser Leu Arg Leu
    50   55   60
Ala Val Gly Leu Arg Asn Thr Pro Ser Val Glu Pro Arg
65   70   75

<210> 517
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H8(No Cys, Ala - Delta 3)

<400> 517
Phe Gly Tyr Leu Leu Lys Gly Glu Ser Tyr Gly Arg Ile Ile Gln Asn
 1   5   10   15
Glu Asp Ile Pro Ile Gly Asn Cys Asn Thr Lys Cys Gln Thr Tyr Ala
            20   25   30
Gly Ala Ile Asn Ser Ser Lys Pro Phe Gln Asn Ala Ser Arg His Tyr
        35   40   45
Met Gly Glu Cys Pro Lys Tyr Val Lys Lys Ala Ser Leu Arg Leu Ala
    50   55   60
Val Gly Leu Arg Asn Thr Pro Ser Val Glu Pro Arg
65   70   75

<210> 518
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H9(No Cys, Ala)

<400> 518
Pro Trp Tyr Gly His Val Leu Thr Gly Glu Ser His Gly Arg Ile Leu
 1   5   10   15
Lys Thr Asp Leu Asn Asn Gly Asn Cys Val Val Gln Cys Gln Thr Glu
            20   25   30
Lys Gly Gly Leu Asn Thr Thr Leu Pro Phe His Asn Ile Ser Lys Tyr
        35   40   45
Ala Phe Gly Asn Cys Pro Lys Tyr Val Gly Val Lys Ser Leu Lys Leu
    50   55   60
Pro Val Gly Leu Arg Asn Val Pro Ala Val Ser Ser Arg
65   70   75

<210> 519
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H9(No Cys, Ala - Delta 1)

<400> 519
Trp Tyr Gly His Val Leu Thr Gly Glu Ser His Gly Arg Ile Leu Lys

```
 1               5                  10                  15
Thr Asp Leu Asn Asn Gly Asn Cys Val Val Gln Cys Gln Thr Glu Lys
            20                  25                  30
Gly Gly Leu Asn Thr Thr Leu Pro Phe His Asn Ile Ser Lys Tyr Ala
        35                  40                  45
Phe Gly Asn Cys Pro Lys Tyr Val Gly Val Lys Ser Leu Lys Leu Pro
    50                  55                  60
Val Gly Leu Arg Asn Val Pro Ala Val Ser Ser Arg
65                  70                  75
```

<210> 520
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H9(No Cys, Ala - Delta 3)

<400> 520
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Tyr Gly His Val Leu Thr Gly Glu Ser His Gly Arg Ile Leu Lys Thr
 1               5                  10                  15
Asp Leu Asn Asn Gly Asn Cys Val Val Gln Cys Gln Thr Glu Lys Gly
            20                  25                  30
Gly Leu Asn Thr Thr Leu Pro Phe His Asn Ile Ser Lys Tyr Ala Phe
        35                  40                  45
Gly Asn Cys Pro Lys Tyr Val Gly Val Lys Ser Leu Lys Leu Pro Val
    50                  55                  60
Gly Leu Arg Asn Val Pro Ala Val Ser Ser Arg
65                  70                  75
```

<210> 521
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H10(No Cys, Ala)

<400> 521
```
Pro Ser Arg Val Ser Lys Leu Thr Gly Arg Asp Leu Gly Ile Gln Ser
 1               5                  10                  15
Glu Ala Leu Ile Asp Asn Ser Cys Glu Ser Lys Cys Phe Trp Arg Gly
            20                  25                  30
Gly Ser Ile Asn Thr Lys Leu Pro Phe Gln Asn Leu Ser Pro Arg Thr
        35                  40                  45
Val Gly Gln Cys Pro Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala
    50                  55                  60
Thr Gly Met Arg Asn Val Pro Glu Val Val Gln Gly Arg
65                  70                  75
```

<210> 522
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H10(No Cys, Ala - Delta 1)

<400> 522
Ser Arg Val Ser Lys Leu Thr Gly Arg Asp Leu Gly Ile Gln Ser Glu
 1   5   10   15
Ala Leu Ile Asp Asn Ser Cys Glu Ser Lys Cys Phe Trp Arg Gly Gly
            20   25   30
Ser Ile Asn Thr Lys Leu Pro Phe Gln Asn Leu Ser Pro Arg Thr Val
        35   40   45
Gly Gln Cys Pro Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala Thr
    50   55   60
Gly Met Arg Asn Val Pro Glu Val Val Gln Gly Arg
65   70   75

<210> 523
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H10(No Cys, Ala - Delta 3)

<400> 523
Arg Val Ser Lys Leu Thr Gly Arg Asp Leu Gly Ile Gln Ser Glu Ala
 1   5   10   15
Leu Ile Asp Asn Ser Cys Glu Ser Lys Cys Phe Trp Arg Gly Gly Ser
            20   25   30
Ile Asn Thr Lys Leu Pro Phe Gln Asn Leu Ser Pro Arg Thr Val Gly
        35   40   45
Gln Cys Pro Lys Tyr Val Asn Gln Arg Ser Leu Leu Leu Ala Thr Gly
    50   55   60
Met Arg Asn Val Pro Glu Val Val Gln Gly Arg
65   70   75

<210> 524
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
      subtype H11(No Cys, Ala)

<400> 524
Pro Arg Tyr Ala Phe Glu Ile Val Ser Val Gly Asn Gly Lys Leu Phe
 1   5   10   15
Arg Ser Glu Leu Asn Ile Glu Ser Cys Ser Thr Lys Cys Gln Thr Glu
            20   25   30
Ile Gly Gly Ile Asn Thr Asn Lys Ser Phe His Asn Val His Arg Asn
        35   40   45
Thr Ile Gly Asp Cys Pro Lys Tyr Val Asn Val Lys Ser Leu Lys Leu
    50   55   60
Ala Thr Gly Pro Arg Asn Val Pro Ala Ile Ala Ser Arg
65   70   75

<210> 525
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H11(No Cys, Ala - Delta 1)

<400> 525
Arg Tyr Ala Phe Glu Ile Val Ser Val Gly Asn Gly Lys Leu Phe Arg
 1   5   10   15
Ser Glu Leu Asn Ile Glu Ser Cys Ser Thr Lys Cys Gln Thr Glu Ile
            20   25   30
Gly Gly Ile Asn Thr Asn Lys Ser Phe His Asn Val His Arg Asn Thr
        35   40   45
Ile Gly Asp Cys Pro Lys Tyr Val Asn Val Lys Ser Leu Lys Leu Ala
    50   55   60
Thr Gly Pro Arg Asn Val Pro Ala Ile Ala Ser Arg
65   70   75

<210> 526
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H11(No Cys, Ala - Delta 3)

<400> 526
Tyr Ala Phe Glu Ile Val Ser Val Gly Asn Gly Lys Leu Phe Arg Ser
 1   5   10   15
Glu Leu Asn Ile Glu Ser Cys Ser Thr Lys Cys Gln Thr Glu Ile Gly
            20   25   30
Gly Ile Asn Thr Asn Lys Ser Phe His Asn Val His Arg Asn Thr Ile
        35   40   45
Gly Asp Cys Pro Lys Tyr Val Asn Val Lys Ser Leu Lys Leu Ala Thr
    50   55   60
Gly Pro Arg Asn Val Pro Ala Ile Ala Ser Arg
65   70   75

<210> 527
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H12(No Cys, Ala)

<400> 527
Pro Glu Tyr Gly His Leu Ile Thr Gly Lys Ser His Gly Arg Ile Leu
 1   5   10   15
Lys Asn Asn Leu Pro Met Gly Gln Cys Val Thr Glu Cys Gln Leu Asn
            20   25   30
Glu Gly Val Met Asn Thr Ser Lys Pro Phe Gln Asn Thr Ser Lys His
        35   40   45
Tyr Ile Gly Lys Cys Pro Lys Tyr Ile Pro Ser Gly Ser Leu Lys Leu
    50   55   60
Ala Ile Gly Leu Arg Asn Val Pro Gln Val Gln Asp Arg
65   70   75

<210> 528
<211> 76

<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H12(No Cys, Ala - Delta 1)

<400> 528
Glu Tyr Gly His Leu Ile Thr Gly Lys Ser His Gly Arg Ile Leu Lys
1 5 10 15
Asn Asn Leu Pro Met Gly Gln Cys Val Thr Glu Cys Gln Leu Asn Glu
20 25 30
Gly Val Met Asn Thr Ser Lys Pro Phe Gln Asn Thr Ser Lys His Tyr
35 40 45
Ile Gly Lys Cys Pro Lys Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala
50 55 60
Ile Gly Leu Arg Asn Val Pro Gln Val Gln Asp Arg
65 70 75

<210> 529
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H12(No Cys, Ala - Delta 3)

<400> 529
Tyr Gly His Leu Ile Thr Gly Lys Ser His Gly Arg Ile Leu Lys Asn
1 5 10 15
Asn Leu Pro Met Gly Gln Cys Val Thr Glu Cys Gln Leu Asn Glu Gly
20 25 30
Val Met Asn Thr Ser Lys Pro Phe Gln Asn Thr Ser Lys His Tyr Ile
35 40 45
Gly Lys Cys Pro Lys Tyr Ile Pro Ser Gly Ser Leu Lys Leu Ala Ile
50 55 60
Gly Leu Arg Asn Val Pro Gln Val Gln Asp Arg
65 70 75

<210> 530
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H13(No Cys, Ala)

<400> 530
Pro Arg Tyr Gly Tyr Ile Ile Glu Glu Tyr Gly Lys Gly Arg Ile Phe
1 5 10 15
Gln Ser Arg Ile Arg Met Ser Arg Cys Asn Thr Lys Cys Gln Thr Ser
20 25 30
Val Gly Gly Ile Asn Thr Asn Arg Thr Phe Gln Asn Ile Asp Lys Asn
35 40 45
Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu
50 55 60
Ala Thr Gly Leu Arg Asn Val Pro Ala Ile Ser Asn Arg
65 70 75

<210> 531
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H13(No Cys, Ala - Delta 1)

<400> 531
Arg Tyr Gly Tyr Ile Ile Glu Glu Tyr Gly Lys Gly Arg Ile Phe Gln
1 5 10 15
Ser Arg Ile Arg Met Ser Arg Cys Asn Thr Lys Cys Gln Thr Ser Val
20 25 30
Gly Gly Ile Asn Thr Asn Arg Thr Phe Gln Asn Ile Asp Lys Asn Ala
35 40 45
Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala
50 55 60
Thr Gly Leu Arg Asn Val Pro Ala Ile Ser Asn Arg
65 70 75

<210> 532
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H13(No Cys, Ala - Delta 3)

<400> 532
Tyr Gly Tyr Ile Ile Glu Glu Tyr Gly Lys Gly Arg Ile Phe Gln Ser
1 5 10 15
Arg Ile Arg Met Ser Arg Cys Asn Thr Lys Cys Gln Thr Ser Val Gly
20 25 30
Gly Ile Asn Thr Asn Arg Thr Phe Gln Asn Ile Asp Lys Asn Ala Leu
35 40 45
Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr
50 55 60
Gly Leu Arg Asn Val Pro Ala Ile Ser Asn Arg
65 70 75

<210> 533
<211> 77
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H14(No Cys, Ala)

<400> 533
Pro Arg Gly His Tyr Lys Ile Ser Lys Ser Thr Lys Ser Thr Val Leu
1 5 10 15
Lys Ser Asp Lys Arg Ile Gly Ser Cys Thr Ser Pro Cys Leu Thr Asp
20 25 30
Lys Gly Ser Ile Gln Ser Asp Lys Pro Phe Gln Asn Val Ser Arg Ile
35 40 45
Ala Ile Gly Asn Cys Pro Lys Tyr Val Lys Gln Gly Ser Leu Met Leu
50 55 60

Ala Thr Gly Met Arg Asn Ile Pro Gly Lys Gln Ala Lys
65 70 75

<210> 534
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H14(No Cys, Ala - Delta 1)

<400> 534
Arg Gly His Tyr Lys Ile Ser Lys Ser Thr Lys Ser Thr Val Leu Lys
1 5 10 15
Ser Asp Lys Arg Ile Gly Ser Cys Thr Ser Pro Cys Leu Thr Asp Lys
20 25 30
Gly Ser Ile Gln Ser Asp Lys Pro Phe Gln Asn Val Ser Arg Ile Ala
35 40 45
Ile Gly Asn Cys Pro Lys Tyr Val Lys Gln Gly Ser Leu Met Leu Ala
50 55 60
Thr Gly Met Arg Asn Ile Pro Gly Lys Gln Ala Lys
65 70 75

<210> 535
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H14(No Cys, Ala - Delta 3)

<400> 535
Gly His Tyr Lys Ile Ser Lys Ser Thr Lys Ser Thr Val Leu Lys Ser
1 5 10 15
Asp Lys Arg Ile Gly Ser Cys Thr Ser Pro Cys Leu Thr Asp Lys Gly
20 25 30
Ser Ile Gln Ser Asp Lys Pro Phe Gln Asn Val Ser Arg Ile Ala Ile
35 40 45
Gly Asn Cys Pro Lys Tyr Val Lys Gln Gly Ser Leu Met Leu Ala Thr
50 55 60
Gly Met Arg Asn Ile Pro Gly Lys Gln Ala Lys
65 70 75

<210> 536
<211> 87
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H15(No Cys, Ala)

<400> 536
Pro Asp Arg Ala Thr Phe Leu Arg Ser Asn Ala Pro Ser Gly Ile Glu
1 5 10 15
Tyr Asn Gly Lys Ser Leu Gly Ile Gln Ser Asp Ala Gln Ile Asp Glu
20 25 30
Ser Cys Glu Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro

35 40 45
Leu Pro Phe Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg
50 55 60
Tyr Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val
65 70 75 80
Pro Glu Lys Ile Arg Thr Arg
85

<210> 537
<211> 86
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H15(No Cys, Ala - Delta 1)

<400> 537
Asp Arg Ala Thr Phe Leu Arg Ser Asn Ala Pro Ser Gly Ile Glu Tyr
1 5 10 15
Asn Gly Lys Ser Leu Gly Ile Gln Ser Asp Ala Gln Ile Asp Glu Ser
20 25 30
Cys Glu Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro Leu
35 40 45
Pro Phe Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr
50 55 60
Val Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val Pro
65 70 75 80
Glu Lys Ile Arg Thr Arg
85

<210> 538
<211> 85
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA subtype H15(No Cys, Ala - Delta 3)

<400> 538
Arg Ala Thr Phe Leu Arg Ser Asn Ala Pro Ser Gly Ile Glu Tyr Asn
1 5 10 15
Gly Lys Ser Leu Gly Ile Gln Ser Asp Ala Gln Ile Asp Glu Ser Cys
20 25 30
Glu Gly Glu Cys Phe Tyr Ser Gly Gly Thr Ile Asn Ser Pro Leu Pro
35 40 45
Phe Gln Asn Ile Asp Ser Arg Ala Val Gly Lys Cys Pro Arg Tyr Val
50 55 60
Lys Gln Ser Ser Leu Pro Leu Ala Leu Gly Met Lys Asn Val Pro Glu
65 70 75 80
Lys Ile Arg Thr Arg
85

<210> 539
<211> 77
<212> PRT
<213> Influenza virus A

<220>

<223> C-termianl long stem domain segment of Influenza A HA
subtype H16(No Cys, Ala)

<400> 539
Pro Arg Tyr Gly Tyr Ile Ile Glu Lys Tyr Gly Thr Gly Arg Ile Phe
 1   5   10   15
Gln Ser Gly Val Arg Met Ala Arg Cys Asn Thr Lys Cys Gln Thr Ser
            20   25   30
Leu Gly Gly Ile Asn Thr Asn Lys Thr Phe Gln Asn Ile Glu Arg Asn
        35   40   45
Ala Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu
    50   55   60
Ala Thr Gly Leu Arg Asn Val Pro Ser Ile Gly Glu Arg
65   70   75

<210> 540
<211> 76
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H16(No Cys, Ala - Delta 1)

<400> 540
Arg Tyr Gly Tyr Ile Ile Glu Lys Tyr Gly Thr Gly Arg Ile Phe Gln
 1   5   10   15
Ser Gly Val Arg Met Ala Arg Cys Asn Thr Lys Cys Gln Thr Ser Leu
            20   25   30
Gly Gly Ile Asn Thr Asn Lys Thr Phe Gln Asn Ile Glu Arg Asn Ala
        35   40   45
Leu Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala
    50   55   60
Thr Gly Leu Arg Asn Val Pro Ser Ile Gly Glu Arg
65   70   75

<210> 541
<211> 75
<212> PRT
<213> Influenza virus A

<220>
<223> C-termianl long stem domain segment of Influenza A HA
subtype H16(No Cys, Ala - Delta 3)

<400> 541
Tyr Gly Tyr Ile Ile Glu Lys Tyr Gly Thr Gly Arg Ile Phe Gln Ser
 1   5   10   15
Gly Val Arg Met Ala Arg Cys Asn Thr Lys Cys Gln Thr Ser Leu Gly
            20   25   30
Gly Ile Asn Thr Asn Lys Thr Phe Gln Asn Ile Glu Arg Asn Ala Leu
        35   40   45
Gly Asp Cys Pro Lys Tyr Ile Lys Ser Gly Gln Leu Lys Leu Ala Thr
    50   55   60
Gly Leu Arg Asn Val Pro Ser Ile Gly Glu Arg
65   70   75

<210> 542
<211> 16
<212> PRT

<213> Artificial Sequence

<220>
<223> linker sequence

<400> 542
Lys Leu Asn Gly Ser Gly Ile Met Lys Thr Glu Gly Thr Leu Glu Asn
 1   5   10   15

<210> 543
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> linker sequence

<400> 543
Asn Asn Ile Asp Thr
 1   5

<210> 544
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of influenza HA polypeptide

<400> 544
Thr Gly Leu Arg Asn
 1   5

<210> 545
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of influenza HA polypeptide

<400> 545
Gly Ile Thr Asn Lys Val Asn Ser Val Ile Glu Lys
 1   5   10

<210> 546
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> linker sequence

<400> 546
Asn Asn Ile Asp Thr
 1   5

<210> 547

<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of influenza HA polypeptide

<400> 547
Thr Gly Met Arg Asn
 1   5

<210> 548
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of influenza HA polypeptide

<400> 548
Gln Ile Asn Gly Lys Leu Asn Arg Leu Ile Glu Lys
 1   5   10

<210> 549
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> sequence of influenza HA polypeptide

<400> 549
Gln Ile Asn Gly Lys Leu Asn Arg Val Ile Glu Lys
 1   5   10

<210> 550
<211> 94
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct
      variant Cys94-Cys143

<400> 550
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
 1   5   10   15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20   25   30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Gln
        35   40   45
Thr Arg Gly Lys Leu Cys Pro Asn Cys Leu Asn Cys Thr Asp Leu Asp
    50   55   60
Val Ala Leu Gly Arg Pro Lys Cys Met Gly Thr Ile Pro Ser Ala Lys
65   70   75   80
Ala Ser Ile Leu His Glu Val Lys Pro Val Thr Ser Gly Cys
                85   90

<210> 551

<211> 178
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct
variant Cys178-Cys272

<400> 551
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
 1   5   10   15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20   25   30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Gln
        35   40   45
Thr Arg Gly Lys Leu Cys Pro Asn Cys Leu Asn Cys Thr Asp Leu Asp
    50   55   60
Val Ala Leu Gly Arg Pro Lys Cys Met Gly Thr Ile Pro Ser Ala Lys
65   70   75   80
Ala Ser Ile Leu His Glu Val Lys Pro Val Thr Ser Gly Cys Phe Pro
                85   90   95
Ile Met His Asp Arg Thr Lys Ile Arg Gln Leu Pro Asn Leu Leu Arg
            100   105   110
Gly Tyr Glu Asn Ile Arg Leu Ser Ala Arg Asn Val Thr Asn Ala Glu
        115   120   125
Thr Ala Pro Gly Gly Pro Tyr Ile Val Gly Thr Ser Gly Ser Cys Pro
    130   135   140
Asn Val Thr Asn Gly Asn Gly Phe Phe Ala Thr Met Ala Trp Ala Val
145   150   155   160
Pro Lys Asn Lys Thr Ala Thr Asn Pro Leu Thr Val Glu Val Pro Tyr
                165   170   175
Ile Cys

<210> 552
<211> 54
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct
variant Cys54-Cys272

<400> 552
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val
 1   5   10   15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20   25   30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Gln
        35   40   45
Thr Arg Gly Lys Leu Cys
    50

<210> 553
<211> 200
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 C-terminal Stem Segment of Influenza B HA construct
variant Cys94-Cys143

<400> 553
Cys Pro Asn Val Thr Asn Gly Asn Gly Phe Phe Ala Thr Met Ala Trp
 1   5   10   15
Ala Val Pro Lys Asn Lys Thr Ala Thr Asn Pro Leu Thr Val Glu Val
            20   25   30
Pro Tyr Ile Cys Thr Lys Gly Glu Asp Gln Ile Thr Val Trp Gly Phe
        35   40   45
His Ser Asp Asp Glu Thr Gln Met Val Lys Leu Tyr Gly Asp Ser Lys
    50   55   60
Pro Gln Lys Phe Thr Ser Ser Ala Asn Gly Val Thr Thr His Tyr Val
65   70   75   80
Ser Gln Ile Gly Gly Phe Pro Asn Gln Ala Glu Asp Glu Gly Leu Pro
                85   90   95
Gln Ser Gly Arg Ile Val Val Asp Tyr Met Val Gln Lys Pro Gly Lys
            100   105   110
Thr Gly Thr Ile Ala Tyr Gln Arg Gly Val Leu Leu Pro Gln Lys Val
        115   120   125
Trp Cys Ala Ser Gly Arg Ser Lys Val Ile Lys Gly Ser Leu Pro Leu
    130   135   140
Ile Gly Glu Ala Asp Cys Leu His Glu Lys Tyr Gly Gly Leu Asn Lys
145   150   155   160
Ser Lys Pro Tyr Tyr Thr Gly Glu His Ala Lys Ala Ile Gly Asn Cys
                165   170   175
Pro Ile Trp Val Lys Thr Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr
            180   185   190
Arg Pro Pro Ala Lys Leu Leu Lys
        195   200

<210> 554
<211> 71
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 C-terminal Stem Segment of Influenza B HA construct
      variant Cys178-Cys272

<400> 554
Cys Ala Ser Gly Arg Ser Lys Val Ile Lys Gly Ser Leu Pro Leu Ile
 1   5   10   15
Gly Glu Ala Asp Cys Leu His Glu Lys Tyr Gly Gly Leu Asn Lys Ser
            20   25   30
Lys Pro Tyr Tyr Thr Gly Glu His Ala Lys Ala Ile Gly Asn Cys Pro
        35   40   45
Ile Trp Val Lys Thr Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr Arg
    50   55   60
Pro Pro Ala Lys Leu Leu Lys
65   70

<210> 555
<211> 94
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 N-terminal Stem Segment of Influenza B HA construct variant
      Cys94-Cys143-Cys178-Cys272

<400> 555
Asp Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val

```
 1               5                  10                  15
Lys Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu
            20                  25                  30
Thr Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Gln
        35                  40                  45
Thr Arg Gly Lys Leu Cys Pro Asn Cys Leu Asn Cys Thr Asp Leu Asp
    50                  55                  60
Val Ala Leu Gly Arg Pro Lys Cys Met Gly Thr Ile Pro Ser Ala Lys
65                  70                  75                  80
Ala Ser Ile Leu His Glu Val Lys Pro Val Thr Ser Gly Cys
                85                  90
```

<210> 556
<211> 36
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 intermediate Segment of Influenza B HA construct variant Cys94-Cys143-Cys178-Cys272

<400> 556

```
Cys Pro Asn Val Thr Asn Gly Asn Gly Phe Phe Ala Thr Met Ala Trp
 1               5                  10                  15
Ala Val Pro Lys Asn Lys Thr Ala Thr Asn Pro Leu Thr Val Glu Val
            20                  25                  30
Pro Tyr Ile Cys
        35
```

<210> 557
<211> 71
<212> PRT
<213> Influenza virus B

<220>
<223> HA1 C-terminal Stem Segment of Influenza B HA construct variant Cys94-Cys143-Cys178-Cys272

<400> 557

```
Cys Ala Ser Gly Arg Ser Lys Val Ile Lys Gly Ser Leu Pro Leu Ile
 1               5                  10                  15
Gly Glu Ala Asp Cys Leu His Glu Lys Tyr Gly Gly Leu Asn Lys Ser
            20                  25                  30
Lys Pro Tyr Tyr Thr Gly Glu His Ala Lys Ala Ile Gly Asn Cys Pro
        35                  40                  45
Ile Trp Val Lys Thr Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr Arg
    50                  55                  60
Pro Pro Ala Lys Leu Leu Lys
65                  70
```

<210> 558
<211> 585
<212> PRT
<213> Influenza virus B

<220>
<223> representative sequence of influenza virus B hemagglutinin (in Fig. 2)

<400> 558

```
Met Lys Ala Ile Ile Val Ile Leu Met Val Val Thr Ser Asn Ala Asp
 1               5                  10                  15
Arg Ile Cys Thr Gly Ile Thr Ser Ser Asn Ser Pro His Val Val Lys
            20                  25                  30
Thr Ala Thr Gln Gly Glu Val Asn Val Thr Gly Val Ile Pro Leu Thr
        35                  40                  45
Thr Thr Pro Thr Lys Ser His Phe Ala Asn Leu Lys Gly Thr Glu Thr
    50                  55                  60
Arg Gly Lys Leu Cys Pro Lys Cys Leu Asn Cys Thr Asp Leu Asp Val
65                  70                  75                  80
Ala Leu Gly Arg Pro Lys Cys Thr Gly Lys Ile Pro Ser Ala Arg Val
                85                  90                  95
Ser Ile Leu His Glu Val Arg Pro Val Thr Ser Gly Cys Phe Pro Ile
            100                 105                 110
Met His Asp Arg Thr Lys Ile Arg Gln Leu Pro Asn Leu Leu Arg Gly
        115                 120                 125
Tyr Glu His Ile Arg Leu Ser Thr His Asn Val Ile Asn Ala Glu Asn
    130                 135                 140
Ala Pro Gly Gly Pro Tyr Lys Ile Gly Thr Ser Gly Ser Cys Pro Asn
145                 150                 155                 160
Ile Thr Asn Gly Asn Gly Phe Phe Ala Thr Met Ala Trp Ala Val Pro
                165                 170                 175
Lys Asn Asp Lys Asn Lys Thr Ala Thr Asn Pro Leu Thr Ile Glu Val
            180                 185                 190
Pro Tyr Ile Cys Thr Glu Gly Glu Asp Gln Ile Thr Val Trp Gly Phe
        195                 200                 205
His Ser Asp Ser Glu Thr Gln Met Ala Lys Leu Tyr Gly Asp Ser Lys
    210                 215                 220
Pro Gln Lys Phe Thr Ser Ser Ala Asn Gly Val Thr Thr His Tyr Val
225                 230                 235                 240
Ser Gln Ile Gly Gly Phe Pro Asn Gln Thr Glu Asp Gly Gly Leu Pro
                245                 250                 255
Gln Ser Gly Arg Ile Val Val Asp Tyr Met Val Gln Lys Ser Gly Lys
            260                 265                 270
Thr Gly Thr Ile Thr Tyr Gln Arg Gly Ile Leu Leu Pro Gln Lys Val
        275                 280                 285
Trp Cys Ala Ser Gly Arg Ser Lys Val Ile Lys Gly Ser Leu Pro Leu
    290                 295                 300
Ile Gly Glu Ala Asp Cys Leu His Glu Lys Tyr Gly Gly Leu Asn Lys
305                 310                 315                 320
Ser Lys Pro Tyr Tyr Thr Gly Glu His Ala Lys Ala Ile Gly Asn Cys
                325                 330                 335
Pro Ile Trp Val Lys Thr Pro Leu Lys Leu Ala Asn Gly Thr Lys Tyr
            340                 345                 350
Arg Pro Pro Ala Lys Leu Leu Lys Glu Arg Gly Phe Phe Gly Ala Ile
        355                 360                 365
Ala Gly Phe Leu Glu Gly Gly Trp Glu Gly Met Ile Ala Gly Trp His
    370                 375                 380
Gly Tyr Thr Ser His Gly Ala His Gly Val Ala Val Ala Ala Asp Leu
385                 390                 395                 400
Lys Ser Thr Gln Glu Ala Ile Asn Lys Ile Thr Lys Asn Leu Asn Ser
                405                 410                 415
Leu Ser Glu Leu Glu Val Lys Asn Leu Gln Arg Leu Ser Gly Ala Met
            420                 425                 430
Asp Glu Leu His Asn Glu Ile Leu Glu Leu Asp Glu Lys Val Asp Asp
        435                 440                 445
Leu Arg Ala Asp Thr Ile Ser Ser Gln Ile Glu Leu Ala Val Leu Leu
    450                 455                 460
Ser Asn Glu Thr Phe Asp Ser Leu Asn Ile Thr Ala Ala Ser Leu Asn
465                 470                 475                 480
Asp Asp Gly Leu Asp Asn His Thr Ile Leu Leu Tyr Tyr Ser Thr Ala
                485                 490                 495
Ala Ser Ser Leu Ala Val Thr Leu Met Ile Ala Ile Phe Val Val Tyr
```

```
            500                 505                 510
Met Val Ser Arg Asp Asn Val Ser Cys Ser Ile Cys Leu Gly Ile Ile
        515                 520                 525
Asn Ser Glu Asp Glu His Leu Leu Ala Leu Glu Arg Lys Leu Lys Lys
    530                 535                 540
Met Leu Gly Pro Ser Ala Val Glu Ile Gly Asn Gly Cys Phe Glu Thr
545                 550                 555                 560
Lys His Lys Cys Asn Gln Thr Cys Leu Asp Arg Ile Ala Ala Gly Thr
                565                 570                 575
Phe Asp Ala Gly Glu Phe Ser Leu Pro
            580                 585


<210> 559
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> linker sequence

<400> 559
Lys Leu Asn Gly Ser Gly Ile Met Lys Thr Glu Gly Thr Leu Glu Asn
 1               5                   10                  15


<210> 560
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 signal peptides

<400> 560
Met Glu Leu Ile Val Leu Leu Ile Leu Leu Asn Pro Tyr Thr Phe Val
 1               5                   10                  15
Leu Gly



<210> 561
<211> 42
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 N-terminal stem segment

<400> 561
Asp Arg Ile Cys Ile Gly Tyr Gln Ala Asn Gln Asn Asn Gln Thr Val
 1               5                   10                  15
Asn Thr Leu Leu Glu Gln Asn Val Pro Val Thr Gly Ala Gln Glu Ile
            20                  25                  30
Leu Glu Thr Asn His Asn Gly Lys Leu Cys
        35                  40


<210> 562
<211> 53
<212> PRT
<213> Artificial Sequence
```

<220>
<223> influenza A HA subtype H17 C-terminal stem segment

<400> 562
Cys Ser Thr Lys Cys Gln Thr Pro Leu Gly Ala Leu Asn Ser Thr Leu
 1   5   10   15
Pro Phe Gln Asn Val His Gln Gln Thr Ile Gly Asn Cys Pro Lys Tyr
            20   25   30
Val Lys Ala Thr Ser Leu Met Leu Ala Thr Gly Leu Arg Asn Asn Pro
        35   40   45
Gln Met Glu Gly Arg
    50

<210> 563
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 HA2 domain

<400> 563
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Glu Asn Gln Glu Gly Ser
            20   25   30
Gly Tyr Ala Ala Asp Lys Glu Ala Thr Gln Lys Ala Val Asp Ala Ile
        35   40   45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Ser Gln Phe Glu
    50   55   60
Ser Asn Ile Lys Glu Phe Asn Arg Leu Glu Leu Arg Ile Gln His Leu
65   70   75   80
Ser Asp Arg Val Asp Asp Ala Leu Leu Asp Ile Trp Ser Tyr Asn Thr
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100   105   110
Ala Asn Val Lys Asn Leu Phe Glu Lys Val Lys Ala Gln Leu Lys Asp
        115   120   125
Asn Ala Ile Asp Glu Gly Asn Gly Cys Phe Leu Leu Leu His Lys Cys
    130   135   140
Asn Asn Ser Cys Met Asp Asp Ile Lys Asn Gly Thr Tyr Lys Tyr Met
145   150   155   160
Asp Tyr Arg Glu Glu Ser His Ile Glu Lys Gln Lys Ile Asp Gly Val
                165   170   175
Lys Leu Thr Asp Tyr Ser Arg Tyr Tyr Ile Met Thr Leu Tyr Ser Thr
            180   185   190
Ile Ala Ser Ser Val Val Leu Gly Ser Leu Ile Ile Ala Ala Phe Leu
        195   200   205
Trp Gly Cys Gln Lys Gly Ser Ile Gln Cys Lys Ile Cys Ile
    210   215   220

<210> 564
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> N-terminal stem segment of Influenza A HA subtype H17(no Cys)

<400> 564
Asp Arg Ile Cys Ile Gly Tyr Gln Ala Asn Gln Asn Asn Gln Thr Val

 1   5   10   15
Asn Thr Leu Leu Glu Gln Asn Val Pro Val Thr Gly Ala Gln Glu Ile
            20   25   30
Leu Glu Thr Asn His Asn Gly Lys Leu
        35   40

<210> 565
<211> 52
<212> PRT
<213> Artificial Sequence

<220>
<223> C-terminal stem segment of Influenza A HA subtype H17(no Cys)

<400> 565
Ser Thr Lys Cys Gln Thr Pro Leu Gly Ala Leu Asn Ser Thr Leu Pro
 1   5   10   15
Phe Gln Asn Val His Gln Gln Thr Ile Gly Asn Cys Pro Lys Tyr Val
            20   25   30
Lys Ala Thr Ser Leu Met Leu Ala Thr Gly Leu Arg Asn Asn Pro Gln
        35   40   45
Met Glu Gly Arg
    50

<210> 566
<211> 180
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA2 domain subtype H17 stem domain

<400> 566
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1   5   10   15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Glu Asn Gln Glu Gly Ser
            20   25   30
Gly Tyr Ala Ala Asp Lys Glu Ala Thr Gln Lys Ala Val Asp Ala Ile
        35   40   45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Ser Gln Phe Glu
    50   55   60
Ser Asn Ile Lys Glu Phe Asn Arg Leu Glu Leu Arg Ile Gln His Leu
65   70   75   80
Ser Asp Arg Val Asp Asp Ala Leu Leu Asp Ile Trp Ser Tyr Asn Thr
                85   90   95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100   105   110
Ala Asn Val Lys Asn Leu Phe Glu Lys Val Lys Ala Gln Leu Lys Asp
        115   120   125
Asn Ala Ile Asp Glu Gly Asn Gly Cys Phe Leu Leu Leu His Lys Cys
    130   135   140
Asn Asn Ser Cys Met Asp Asp Ile Lys Asn Gly Thr Tyr Lys Tyr Met
145   150   155   160
Asp Tyr Arg Glu Glu Ser His Ile Glu Lys Gln Lys Ile Asp Gly Val
                165   170   175
Lys Leu Thr Asp
            180

<210> 567
<211> 5

<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA2 domain subtype H17 luminal domain

<400> 567
Tyr Ser Arg Tyr Tyr
 1   5

<210> 568
<211> 27
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA2 domain subtype H17 transmembrane domain

<400> 568
Ile Met Thr Leu Tyr Ser Thr Ile Ala Ser Ser Val Val Leu Gly Ser
 1   5   10   15
Leu Ile Ile Ala Ala Phe Leu Trp Gly Cys Gln
            20   25

<210> 569
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA2 domain subtype H17 cytoplasmic domain

<400> 569
Lys Gly Ser Ile Gln Cys Lys Ile Cys Ile
 1   5   10

<210> 570
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 signal peptide

<400> 570
Met Glu Leu Ile Val Leu Leu Ile Leu Leu Asn Pro Tyr Thr Phe Val
 1   5   10   15
Leu Gly

<210> 571
<211> 42
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 N-terminal stem segment

<400> 571

```
Asp Arg Ile Cys Ile Gly Tyr Gln Ala Asn Gln Asn Asn Gln Thr Val
 1               5                  10                  15
Asn Thr Leu Leu Glu Gln Asn Val Pro Val Thr Gly Ala Gln Glu Ile
            20                  25                  30
Leu Glu Thr Asn His Asn Gly Lys Leu Cys
        35                  40
```

<210> 572
<211> 25
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 C-terminal short stem segment

<400> 572

```
Cys Pro Lys Tyr Val Lys Ala Thr Ser Leu Met Leu Ala Thr Gly Leu
 1               5                  10                  15
Arg Asn Asn Pro Gln Met Glu Gly Arg
            20                  25
```

<210> 573
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 HA2 domain

<400> 573

```
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
 1               5                  10                  15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Glu Asn Gln Glu Gly Ser
            20                  25                  30
Gly Tyr Ala Ala Asp Lys Glu Ala Thr Gln Lys Ala Val Asp Ala Ile
        35                  40                  45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Ser Gln Phe Glu
    50                  55                  60
Ser Asn Ile Lys Glu Phe Asn Arg Leu Glu Leu Arg Ile Gln His Leu
65                  70                  75                  80
Ser Asp Arg Val Asp Asp Ala Leu Leu Asp Ile Trp Ser Tyr Asn Thr
                85                  90                  95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Phe His Asp
            100                 105                 110
Ala Asn Val Lys Asn Leu Phe Glu Lys Val Lys Ala Gln Leu Lys Asp
        115                 120                 125
Asn Ala Ile Asp Glu Gly Asn Gly Cys Phe Leu Leu Leu His Lys Cys
    130                 135                 140
Asn Asn Ser Cys Met Asp Asp Ile Lys Asn Gly Thr Tyr Lys Tyr Met
145                 150                 155                 160
Asp Tyr Arg Glu Glu Ser His Ile Glu Lys Gln Lys Ile Asp Gly Val
                165                 170                 175
Lys Leu Thr Asp Tyr Ser Arg Tyr Tyr Ile Met Thr Leu Tyr Ser Thr
            180                 185                 190
Ile Ala Ser Ser Val Val Leu Gly Ser Leu Ile Ile Ala Ala Phe Leu
        195                 200                 205
Trp Gly Cys Gln Lys Gly Ser Ile Gln Cys Lys Ile Cys Ile
    210                 215                 220
```

<210> 574

<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 N-terminal stem segment

<400> 574
Asp Arg Ile Cys Ile Gly Tyr Gln Ala Asn Gln Asn Asn Gln Thr Val
 1   5   10   15
Asn Thr Leu Leu Glu Gln Asn Val Pro Val Thr Gly Ala Gln Glu Ile
            20   25   30
Leu Glu Thr Asn His Asn Gly Lys Leu
        35   40

<210> 575
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 C-terminal stem segment

<400> 575
Pro Lys Tyr Val Lys Ala Thr Ser Leu Met Leu Ala Thr Gly Leu Arg
 1   5   10   15
Asn Asn Pro Gln Met Glu Gly Arg
            20

<210> 576
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 signal peptide

<400> 576
Met Glu Leu Ile Val Leu Leu Ile Leu Leu Asn Pro Tyr Thr Phe Val
 1   5   10   15
Leu Gly

<210> 577
<211> 90
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 N-terminal long stem segment

<400> 577
Asp Arg Ile Cys Ile Gly Tyr Gln Ala Asn Gln Asn Asn Gln Thr Val
 1   5   10   15
Asn Thr Leu Leu Glu Gln Asn Val Pro Val Thr Gly Ala Gln Glu Ile
            20   25   30
Leu Glu Thr Asn His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Pro
        35   40   45
Pro Leu Asp Leu Gln Ser Cys Thr Leu Ala Gly Trp Leu Leu Gly Asn
    50   55   60

Pro Asn Cys Asp Ser Leu Leu Glu Ala Glu Glu Trp Ser Tyr Ile Lys
65 70 75 80
Ile Asn Glu Ser Ala Pro Asp Asp Leu Cys
85 90

<210> 578
<211> 79
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 C-terminal long stem segment

<400> 578
Ala Pro Glu Tyr Gly Phe Tyr Tyr Lys Arg Lys Glu Gly Lys Gly Gly
1 5 10 15
Leu Met Lys Ser Lys Leu Pro Ile Ser Asp Cys Ser Thr Lys Cys Gln
20 25 30
Thr Pro Leu Gly Ala Leu Asn Ser Thr Leu Pro Phe Gln Asn Val His
35 40 45
Gln Gln Thr Ile Gly Asn Cys Pro Lys Tyr Val Lys Ala Thr Ser Leu
50 55 60
Met Leu Ala Thr Gly Leu Arg Asn Asn Pro Gln Met Glu Gly Arg
65 70 75

<210> 579
<211> 222
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 HA2 domain

<400> 579
Gly Leu Phe Gly Ala Ile Ala Gly Phe Ile Glu Gly Gly Trp Gln Gly
1 5 10 15
Met Ile Asp Gly Trp Tyr Gly Tyr His His Glu Asn Gln Glu Gly Ser
20 25 30
Gly Tyr Ala Ala Asp Lys Glu Ala Thr Gln Lys Ala Val Asp Ala Ile
35 40 45
Thr Asn Lys Val Asn Ser Ile Ile Asp Lys Met Asn Ser Gln Phe Glu
50 55 60
Ser Asn Ile Lys Glu Phe Asn Arg Leu Glu Leu Arg Ile Gln His Leu
65 70 75 80
Ser Asp Arg Val Asp Asp Ala Leu Leu Asp Ile Trp Ser Tyr Asn Thr
85 90 95
Glu Leu Leu Val Leu Leu Glu Asn Glu Arg Thr Leu Asp Phe His Asp
100 105 110
Ala Asn Val Lys Asn Leu Phe Glu Lys Val Lys Ala Gln Leu Lys Asp
115 120 125
Asn Ala Ile Asp Glu Gly Asn Gly Cys Phe Leu Leu His Lys Cys
130 135 140
Asn Asn Ser Cys Met Asp Asp Ile Lys Asn Gly Thr Tyr Lys Tyr Met
145 150 155 160
Asp Tyr Arg Glu Glu Ser His Ile Glu Lys Gln Lys Ile Asp Gly Val
165 170 175
Lys Leu Thr Asp Tyr Ser Arg Tyr Tyr Ile Met Thr Leu Tyr Ser Thr
180 185 190
Ile Ala Ser Ser Val Val Leu Gly Ser Leu Ile Ile Ala Ala Phe Leu
195 200 205
Trp Gly Cys Gln Lys Gly Ser Ile Gln Cys Lys Ile Cys Ile

210 215 220

<210> 580
<211> 89
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 N-terminal long stem segment

<400> 580
Asp Arg Ile Cys Ile Gly Tyr Gln Ala Asn Gln Asn Asn Gln Thr Val
1 5 10 15
Asn Thr Leu Leu Glu Gln Asn Val Pro Val Thr Gly Ala Gln Glu Ile
20 25 30
Leu Glu Thr Asn His Asn Gly Lys Leu Cys Ser Leu Asn Gly Val Pro
35 40 45
Pro Leu Asp Leu Gln Ser Cys Thr Leu Ala Gly Trp Leu Leu Gly Asn
50 55 60
Pro Asn Cys Asp Ser Leu Leu Glu Ala Glu Glu Trp Ser Tyr Ile Lys
65 70 75 80
Ile Asn Glu Ser Ala Pro Asp Asp Leu
85

<210> 581
<211> 78
<212> PRT
<213> Artificial Sequence

<220>
<223> influenza A HA subtype H17 C-terminal long stem segment

<400> 581
Pro Glu Tyr Gly Phe Tyr Tyr Lys Arg Lys Glu Gly Lys Gly Gly Leu
1 5 10 15
Met Lys Ser Lys Leu Pro Ile Ser Asp Cys Ser Thr Lys Cys Gln Thr
20 25 30
Pro Leu Gly Ala Leu Asn Ser Thr Leu Pro Phe Gln Asn Val His Gln
35 40 45
Gln Thr Ile Gly Asn Cys Pro Lys Tyr Val Lys Ala Thr Ser Leu Met
50 55 60
Leu Ala Thr Gly Leu Arg Asn Asn Pro Gln Met Glu Gly Arg
65 70 75

<210> 582
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> a cleavage site recognized by Tobacco Etch Virus (TEV) protease

<220>
<221> Variant
<222> 7
<223> Xaa = Gly or Ser

<400> 582
Glu Asn Leu Tyr Phe Gln Xaa
1 5