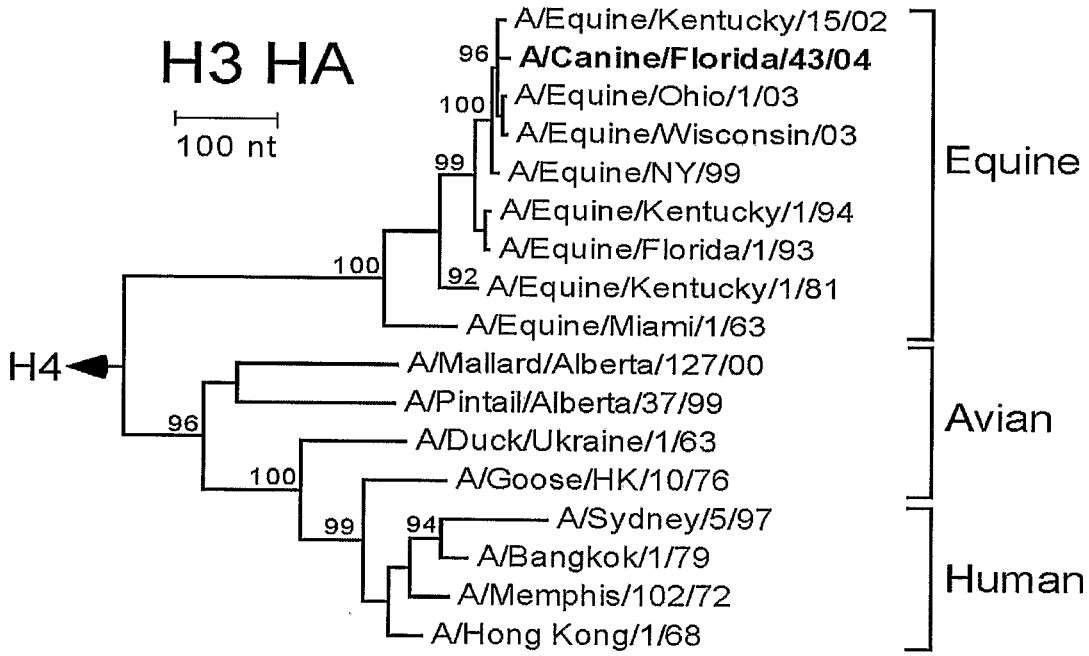

H3 HA
100 nt
H4
A/Equine/Kentucky/15/02
A/Canine/Florida/43/04
A/Equine/Ohio/1/03
A/Equine/Wisconsin/03
A/Equine/NY/99
A/Equine/Kentucky/1/94
A/Equine/Florida/1/93
A/Equine/Kentucky/1/81
A/Equine/Miami/1/63
A/Mallard/Alberta/127/00
A/Pintail/Alberta/37/99
A/Duck/Ukraine/1/63
A/Goose/HK/10/76
A/Sydney/5/97
A/Bangkok/1/79
A/Memphis/102/72
A/Hong Kong/1/68
96
100
99
100
92
96
100
99
94
Equine
Avian
Human

FIG. 1A

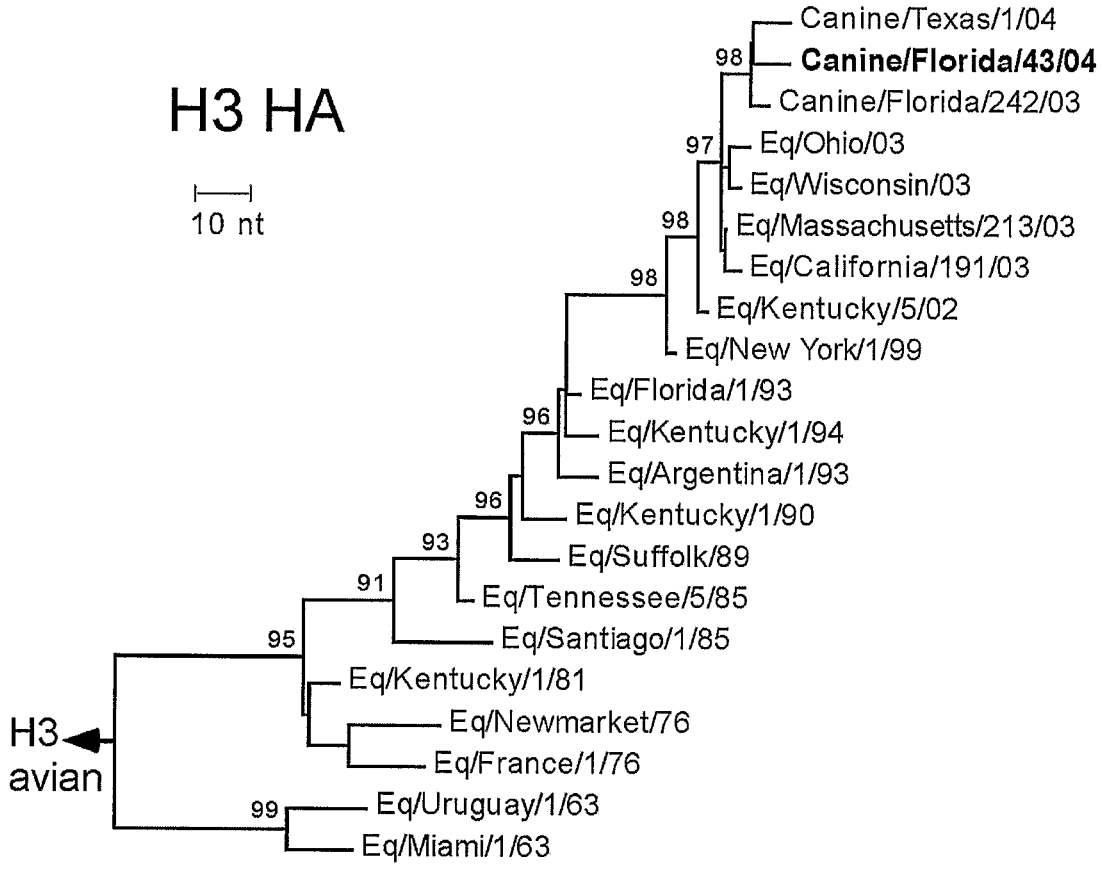

H3 HA
10 nt
Canine/Texas/1/04
Canine/Florida/43/04
Canine/Florida/242/03
Eq/Ohio/03
Eq/Wisconsin/03
Eq/Massachusetts/213/03
Eq/California/191/03
Eq/Kentucky/5/02
Eq/New York/1/99
Eq/Florida/1/93
Eq/Kentucky/1/94
Eq/Argentina/1/93
Eq/Kentucky/1/90
Eq/Suffolk/89
Eq/Tennessee/5/85
Eq/Santiago/1/85
Eq/Kentucky/1/81
Eq/Newmarket/76
Eq/France/1/76
Eq/Uruguay/1/63
Eq/Miami/1/63
H3 avian
98
97
98
98
96
96
93
91
95
99

FIG. 1B

FIG. 2A



FIG. 2B

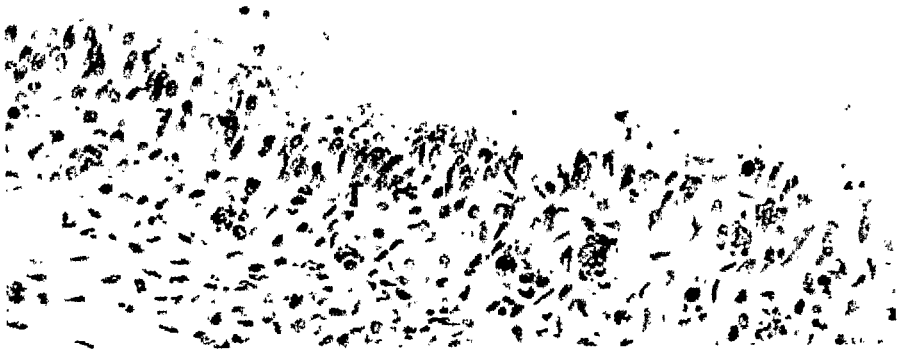




FIG. 3A



FIG. 3B

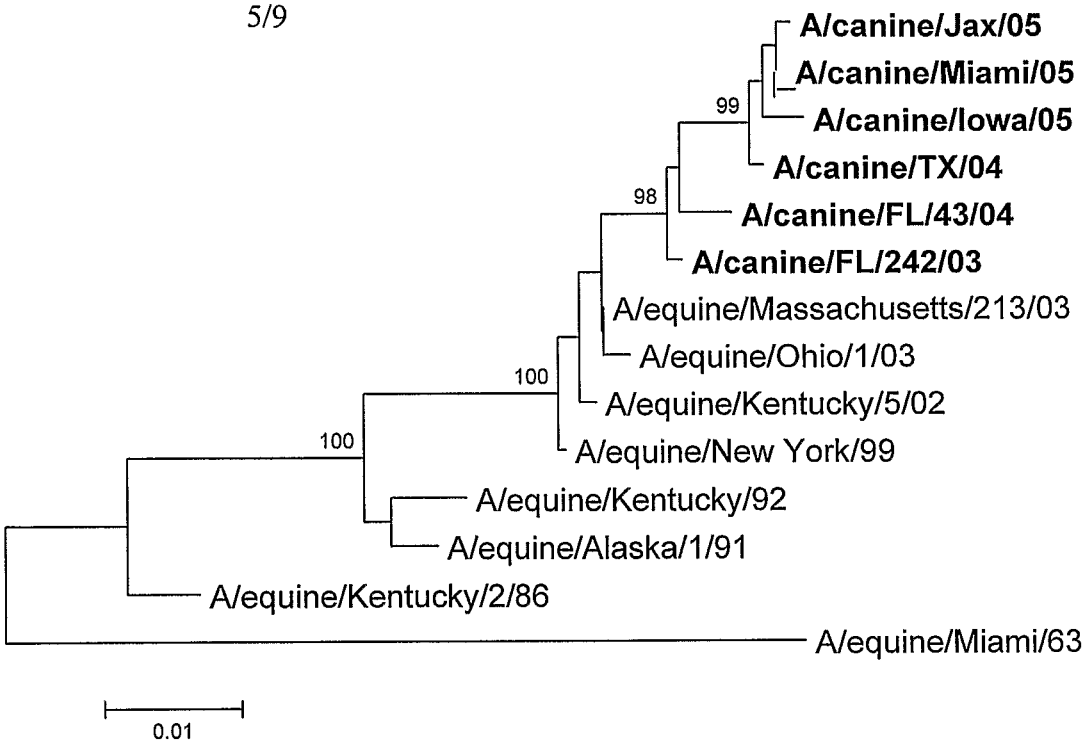

A/canine/Jax/05
A/canine/Miami/05
99
A/canine/Iowa/05
A/canine/TX/04
98
A/canine/FL/43/04
A/canine/FL/242/03
A/equine/Massachusetts/213/03
A/equine/Ohio/1/03
100
A/equine/Kentucky/5/02
100
A/equine/New York/99
A/equine/Kentucky/92
A/equine/Alaska/1/91
A/equine/Kentucky/2/86
A/equine/Miami/63
0.01

FIG. 4A

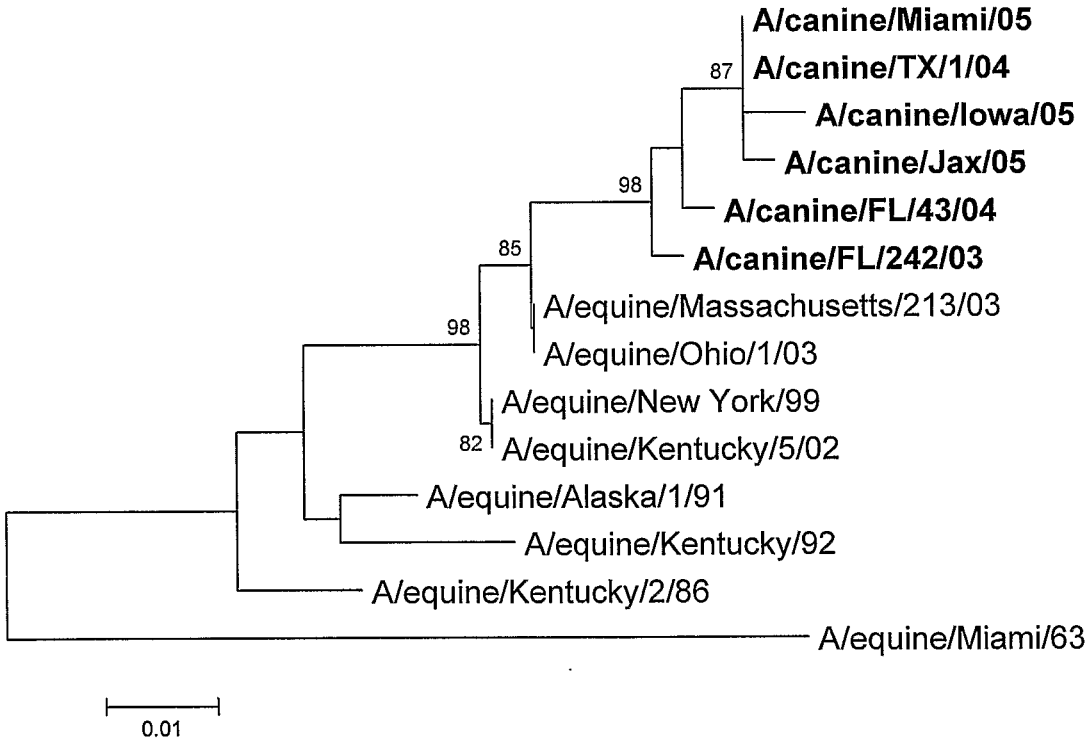

A/canine/Miami/05
87
A/canine/TX/1/04
A/canine/Iowa/05
A/canine/Jax/05
98
A/canine/FL/43/04
85
A/canine/FL/242/03
A/equine/Massachusetts/213/03
98
A/equine/Ohio/1/03
A/equine/New York/99
82
A/equine/Kentucky/5/02
A/equine/Alaska/1/91
A/equine/Kentucky/92
A/equine/Kentucky/2/86
A/equine/Miami/63
0.01

FIG. 4B

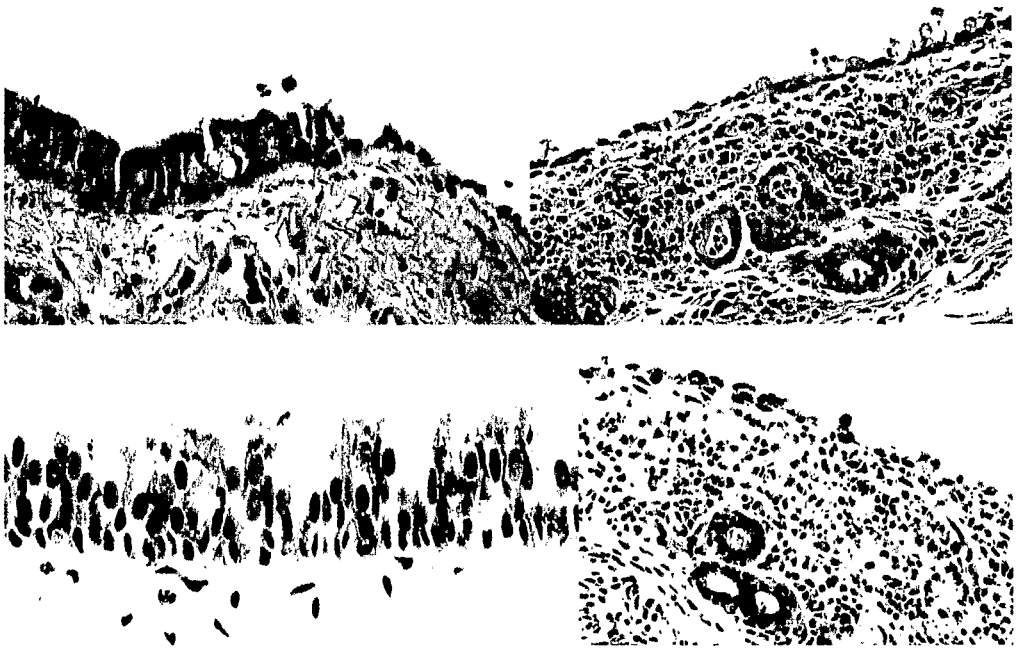


FIG. 5

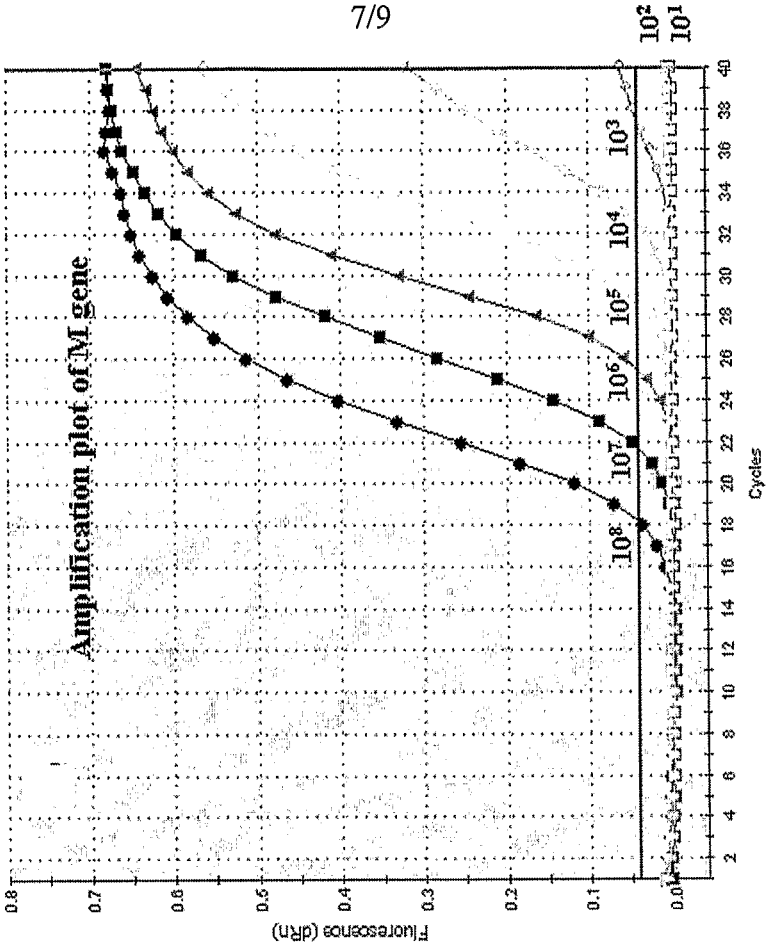

Amplification plot of M gene
Fluorescence (dRn)
Cycles
10^8 10^7 10^6 10^5 10^4 10^3 10^2 10^1

FIG. 6B

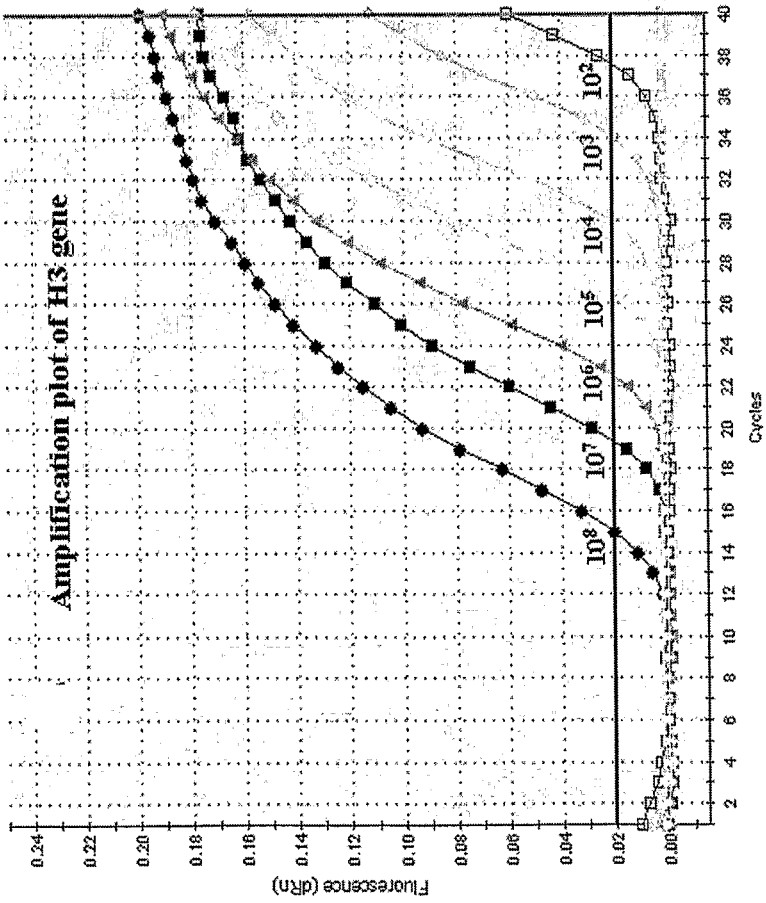

Amplification plot of H3 gene
Fluorescence (dRn)
Cycles
10^8 10^7 10^6 10^5 10^4 10^3 10^2 10^1

FIG. 6A

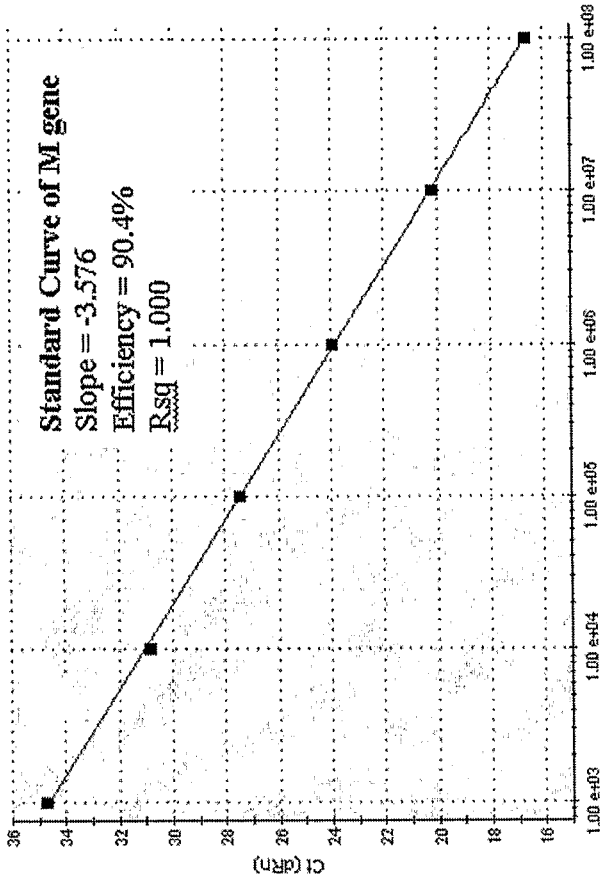

Standard Curve of M gene
Slope = -3.576
Efficiency = 90.4%
Rsq = 1.000
Ct (dRn)
Initial Quantity (copies)

FIG. 6D

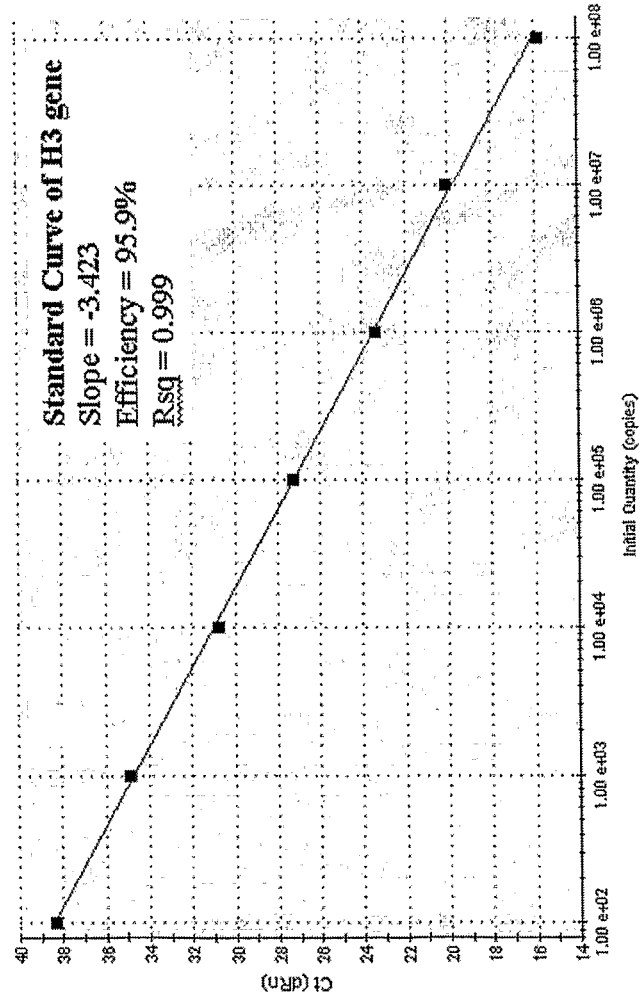

Standard Curve of H3 gene
Slope = -3.423
Efficiency = 95.9%
Rsq = 0.999
Ct (dRn)
Initial Quantity (copies)

FIG. 6C

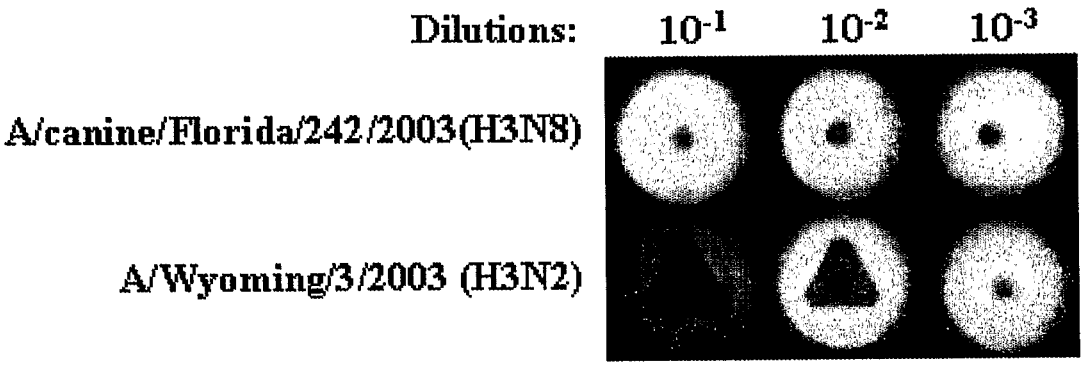

Dilutions:
10^{-1}
10^{-2}
10^{-3}
A/canine/Florida/242/2003(H3N8)
A/Wyoming/3/2003 (H3N2)

FIG. 7

SEQUENCE LISTING

<110> Crawford, Patti Cynthia
Gibbs, E. Paul J.
Dubovi, Edward J.
Donis, Ruben Omar
Katz, Jacqueline M.
Klimov, Alexander I.

<120> Materials and Methods for Respiratory Disease Control in Canines

<130> UF-445XC1

<150> US 60/673,443
<151> 2005-04-21

<160> 88

<170> PatentIn version 3.3

<210> 1
<211> 2277
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2277)

<400> 1

```
atg gag aga ata gaa gaa ctg aga gat ctg atg tta caa tcc cgc acc       48
Met Glu Arg Ile Glu Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1               5                  10                  15

cgc gag ata cta aca aaa act act gtg gac cac atg gcc ata atc aag       96
Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
            20                  25                  30

aaa tac aca tca gaa aga caa gag aag aac cct gca ctt agg atg aaa      144
Lys Tyr Thr Ser Glu Arg Gln Glu Lys Asn Pro Ala Leu Arg Met Lys
        35                  40                  45

tgg atg atg gca atg aaa tac cca att aca gca gat aag agg ata atg      192
Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
    50                  55                  60

gag atg att cct gag aga aat gaa cag ggt caa acc ctt tgg agc aaa      240
Glu Met Ile Pro Glu Arg Asn Glu Gln Gly Gln Thr Leu Trp Ser Lys
65                  70                  75                  80

acg aac gat gct ggc tca gac cgc gta atg gta tca cct ctg gca gtg      288
Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
                85                  90                  95
```

```
aca tgg tgg aat agg aat gga cca aca acg agc aca att cat tat cca      336
Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Ser Thr Ile His Tyr Pro
            100                 105                 110

aaa gtc tac aaa act tat ttt gaa aag gtt gaa aga ttg aaa cac gga      384
Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
        115                 120                 125

act ttt ggc ccc gtt cat ttt agg aat caa gtc aag ata aga cga aga      432
Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
    130                 135                 140

gtt gat gta aac cct ggt cac gcg gac ctc agt gcc aaa gaa gca caa      480
Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145                 150                 155                 160

gat gtg atc atg gaa gtt gtt ttc cca aat gaa gtg gga gcc ata att      528
Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Ile Ile
                165                 170                 175

cta aca tcg gaa tca caa cta aca ata acc aaa gag aaa aag gaa gaa      576
Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
            180                 185                 190

ctt cag gac tgc aaa att gct ccc ttg atg gta gca tac atg cta gaa      624
Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
        195                 200                 205

aga gag ttg gtc cga aaa aca agg ttc ctc cca gta gca ggc gga aca      672
Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Ala Gly Gly Thr
    210                 215                 220

agc agt gta tac att gaa gtg ttg cat ctg act cag gga aca tgc tgg      720
Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225                 230                 235                 240

gag caa atg tac acc cca gga gga gaa gtt aga aac gat gat att gat      768
Glu Gln Met Tyr Thr Pro Gly Gly Glu Val Arg Asn Asp Asp Ile Asp
                245                 250                 255

caa agt tta att att gca gcc cgg aac ata gtg aga aga gcg aca gta      816
Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
            260                 265                 270

tca gca gat cca cta gca tcc cta ctg gaa atg tgc cac agt aca cag      864
Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
        275                 280                 285

att ggt gga ata agg atg gta gac atc ctt aag cag aat cca aca gag      912
Ile Gly Gly Ile Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
    290                 295                 300

gaa caa gct gtg gat ata tgc aaa gca gca atg gga ttg aga att agc      960
Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305                 310                 315                 320
```

```
tca tca ttc agc ttt ggt gga ttc acc ttc aaa aga aca agt gga tca      1008
Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
                325                 330                 335

tca gtc aag aga gaa gaa gaa atg ctt acg ggc aac ctt caa aca ttg      1056
Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
            340                 345                 350

aaa ata aga gtg cat gag ggc tat gaa gaa ttc aca atg gtc gga aga      1104
Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
        355                 360                 365

aga gca aca gcc att atc aaa aag gca acc aga aga ttg att caa ttg      1152
Arg Ala Thr Ala Ile Ile Lys Lys Ala Thr Arg Arg Leu Ile Gln Leu
    370                 375                 380

ata gta agt ggg aga gat gaa caa tca att gct gaa gca ata att gta      1200
Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385                 390                 395                 400

gcc atg gtg ttt tcg caa gaa gat tgc atg ata aaa gca gtt cga ggc      1248
Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
                405                 410                 415

gat ttg aac ttt gtt aat aga gca aat cag cgt ttg aac ccc atg cat      1296
Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
            420                 425                 430

caa ctc ttg agg cat ttc caa aaa gat gca aaa gtg ctt ttc cac aat      1344
Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe His Asn
        435                 440                 445

tgg gga att gaa ccc atc gac aat gta atg ggg atg att gga ata ttg      1392
Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
    450                 455                 460

cct gac atg acc cca agc acc gag atg tca ttg aga gga gtg aga gtc      1440
Pro Asp Met Thr Pro Ser Thr Glu Met Ser Leu Arg Gly Val Arg Val
465                 470                 475                 480

agc aaa atg gga gtg gat gag tac tcc agc act gag aga gtg gtg gtg      1488
Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
                485                 490                 495

agc att gac cgt ttt tta aga gtt cgg gat caa agg gga aac ata cta      1536
Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
            500                 505                 510

ctg tcc cct gaa gaa gtc agt gaa aca caa gga acg gaa aag ctg aca      1584
Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
        515                 520                 525

ata att tat tcg tca tca atg atg tgg gag att aat ggt ccc gaa tca      1632
Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
```

```
    530                 535                 540

gtg ttg gtc aat act tat caa tgg atc atc agg aac tgg gaa att gta      1680
Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545                 550                 555                 560

aaa att cag tgg tca cag gac ccc aca atg tta tac aat aag ata gaa      1728
Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
                565                 570                 575

ttt gag cca ttc caa tcc ctg gtc cct agg gcc acc aga agc caa tac      1776
Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
            580                 585                 590

agc ggt ttc gta aga acc ctg ttt cag caa atg cga gat gta ctt gga      1824
Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
        595                 600                 605

aca ttt gat act gct caa ata ata aaa ctc ctc cct ttt gcc gct gct      1872
Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
    610                 615                 620

cct ccg gaa cag agt agg atg cag ttc tct tct ttg act gtt aat gta      1920
Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625                 630                 635                 640

aga ggt tcg gga atg agg ata ctt gta aga ggc aat tcc cca gtg ttc      1968
Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
                645                 650                 655

aac tac aat aaa gcc act aaa agg ctc aca gtc ctc gga aag gat gca      2016
Asn Tyr Asn Lys Ala Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
            660                 665                 670

ggt gcg ctt act gag gac cca gat gaa ggt acg gct gga gta gaa tct      2064
Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
        675                 680                 685

gct gtt cta aga ggg ttt ctc att tta ggt aaa gag aac aag aga tat      2112
Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
    690                 695                 700

ggc cca gca cta agc atc aat gaa cta agc aaa ctt gca aaa ggg gag      2160
Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705                 710                 715                 720

aaa gcc aat gta cta att ggg caa ggg gac gta gtg ttg gta atg aaa      2208
Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Val Val Leu Val Met Lys
                725                 730                 735

cgg aaa cgt gac tct agc ata ctt act gac agc cag aca gcg acc aaa      2256
Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
            740                 745                 750

agg att cgg atg gcc atc aat                                        2277
```

Arg Ile Arg Met Ala Ile Asn
755

<210> 2
<211> 759
<212> PRT
<213> Influenza virus

<400> 2

Met Glu Arg Ile Glu Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1 5 10 15

Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
20 25 30

Lys Tyr Thr Ser Glu Arg Gln Glu Lys Asn Pro Ala Leu Arg Met Lys
35 40 45

Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
50 55 60

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

Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
85 90 95

Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Ser Thr Ile His Tyr Pro
100 105 110

Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
115 120 125

Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
130 135 140

Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145 150 155 160

Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Ile Ile
165 170 175

Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
180 185 190

Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
195 200 205

Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Ala Gly Gly Thr
210 215 220

Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225 230 235 240

Glu Gln Met Tyr Thr Pro Gly Gly Glu Val Arg Asn Asp Asp Ile Asp
245 250 255

Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
260 265 270

Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
275 280 285

Ile Gly Gly Ile Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
290 295 300

Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305 310 315 320

Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
325 330 335

Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
340 345 350

Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
355 360 365

Arg Ala Thr Ala Ile Ile Lys Lys Ala Thr Arg Arg Leu Ile Gln Leu
370 375 380

Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385 390 395 400

Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
405 410 415

Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
420 425 430

Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe His Asn
435 440 445

Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
450 455 460

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

Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
485 490 495

Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
500 505 510

Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
515 520 525

Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
530 535 540

Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545 550 555 560

Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
565 570 575

Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
580 585 590

Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
595 600 605

Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
610 615 620

```
Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625                 630                 635                 640

Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
                645                 650                 655

Asn Tyr Asn Lys Ala Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
            660                 665                 670

Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
        675                 680                 685

Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
    690                 695                 700

Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705                 710                 715                 720

Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Val Val Leu Val Met Lys
                725                 730                 735

Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
            740                 745                 750

Arg Ile Arg Met Ala Ile Asn
        755


<210>  3
<211>  2274
<212>  DNA
<213>  Influenza virus


<220>
<221>  CDS
<222>  (1)..(2274)

<400>  3
atg gat gtc aat ccg act cta ctc ttc tta aag gtg cca gcg cag aat      48
Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1               5                   10                  15

gct ata agc aca aca ttc cct tat act gga gat cct ccc tac agt cat      96
Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
```

```
            20                  25                  30

gga aca ggg aca gga tac acc atg gat act gtc aac aga aca cac caa      144
Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
        35                  40                  45

tat tca gaa aaa ggg aaa tgg aca aca aac act gag att gga gca cca      192
Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
    50                  55                  60

caa ctt aat cca atc gat gga cca ctt cct gaa gac aat gaa cca agc      240
Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65                  70                  75                  80

ggg tac gcc caa aca gat tgt gta ttg gaa gca atg gct ttc ctt gaa      288
Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
                85                  90                  95

gaa tcc cat cca gga atc ttt gaa aat tcg tgt ctt gaa acg atg gag      336
Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
            100                 105                 110

gtg att cag cag aca aga gtg gac aaa cta aca caa ggc cga caa act      384
Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
        115                 120                 125

tat gat tgg acc ttg aat agg aat caa cct gcc gca aca gca ctt gct      432
Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
    130                 135                 140

aat acg att gaa gta ttc aga tca aat ggt ctg act tcc aat gaa tcg      480
Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145                 150                 155                 160

ggg aga ttg atg gac ttc ctc aaa gat gtc atg gag tcc atg aac aag      528
Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
                165                 170                 175

gaa gaa atg gaa ata aca aca cac ttc caa cgg aag aga aga gta aga      576
Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
            180                 185                 190

gac aac atg aca aag aga atg gta aca cag aga acc ata ggg aag aaa      624
Asp Asn Met Thr Lys Arg Met Val Thr Gln Arg Thr Ile Gly Lys Lys
        195                 200                 205

aaa caa cga tta aac aga aag agc tat cta atc aga aca tta acc cta      672
Lys Gln Arg Leu Asn Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
    210                 215                 220

aac aca atg acc aag gac gct gag aga ggg aaa ttg aaa cga cga gca      720
Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225                 230                 235                 240

atc gct acc cca ggg atg cag ata aga ggg ttt gta tat ttt gtt gaa      768
```

```
Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
                245                 250                 255

aca cta gct cga aga ata tgt gaa aag ctt gaa caa tca gga ttg cca      816
Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
            260                 265                 270

gtt ggc ggt aat gag aaa aag gcc aaa ctg gct aat gtc gtc aga aaa      864
Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
        275                 280                 285

atg atg act aat tcc caa gac act gaa ctc tcc ttc acc atc act ggg      912
Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
    290                 295                 300

gac aat acc aaa tgg aat gaa aat cag aac cca cgc ata ttc ctg gca      960
Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305                 310                 315                 320

atg atc aca tac ata act aga aac cag cca gaa tgg ttc aga aat gtt     1008
Met Ile Thr Tyr Ile Thr Arg Asn Gln Pro Glu Trp Phe Arg Asn Val
                325                 330                 335

cta agc att gca ccg att atg ttc tca aat aaa atg gca aga ctg ggg     1056
Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
            340                 345                 350

aaa gga tat atg ttt gaa agc aaa agt atg aaa ttg aga act caa ata     1104
Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
        355                 360                 365

cca gca gaa atg cta gca agc att gac cta aaa tat ttc aat gat tca     1152
Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
    370                 375                 380

aca aaa aag aaa att gag aag ata cga cca ctt ctg gtt gac ggg act     1200
Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385                 390                 395                 400

gct tca ctg agt cct ggc atg atg atg gga atg ttc aac atg ttg agc     1248
Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
                405                 410                 415

act gtg ctg ggt gta tcc ata tta aac ctg ggc cag agg aaa tac aca     1296
Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
            420                 425                 430

aag acc aca tac tgg tgg gat ggt ctg caa tca tcc gat gac ttt gct     1344
Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
        435                 440                 445

ttg ata gtg aat gcg cct aat cat gaa gga gta caa gct gga gta gac     1392
Leu Ile Val Asn Ala Pro Asn His Glu Gly Val Gln Ala Gly Val Asp
    450                 455                 460
```

```
aga ttc tat aga act tgc aaa ctg gtc ggg atc aac atg agc aaa aag     1440
Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465                 470                 475                 480

aag tcc tac ata aat aga act gga aca ttc gaa ttc aca agc ttt ttc     1488
Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
                485                 490                 495

tac cgg tat ggt ttt gta gcc aat ttc agc atg gaa cta ccc agt ttt     1536
Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
            500                 505                 510

ggg gtt tcc gga ata aat gaa tct gca gac atg agc att gga gtg aca     1584
Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
        515                 520                 525

gtc atc aaa aac aac atg ata aat aat gat ctc ggt cct gcc acg gca     1632
Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
    530                 535                 540

caa atg gca ctc caa ctc ttc att aag gat tat cgg tac aca tac cgg     1680
Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545                 550                 555                 560

tgc cat aga ggt gat acc cag ata caa acc aga aga tct ttt gag ttg     1728
Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
                565                 570                 575

aag aaa ctg tgg gaa cag act cga tca aag act ggt cta ctg gta tca     1776
Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
            580                 585                 590

gat ggg ggt cca aac cta tat aac atc aga aac cta cac atc ccg gaa     1824
Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
        595                 600                 605

gtc tgt tta aaa tgg gag cta atg gat gaa gat tat aag ggg agg cta     1872
Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
    610                 615                 620

tgc aat cca ttg aat cct ttc gtt agt cac aaa gaa att gaa tca gtc     1920
Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625                 630                 635                 640

aac agt gca gta gta atg cct gcg cat ggc cct gcc aaa agc atg gag     1968
Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
                645                 650                 655

tat gat gct gtt gca aca aca cat tct tgg atc ccc aag agg aac cgg     2016
Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
            660                 665                 670

tcc ata ttg aac aca agc caa agg gga gta ctc gaa gat gag cag atg     2064
Ser Ile Leu Asn Thr Ser Gln Arg Gly Val Leu Glu Asp Glu Gln Met
        675                 680                 685
```

```
tat cag aaa tgc tgc aac ctg ttt gaa aaa ttc ttc ccc agc agc tca     2112
Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
    690                 695                 700

tac aga aga cca gtc gga att tct agt atg gtt gag gcc atg gtg tcc     2160
Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705                 710                 715                 720

agg gcc cgc att gat gca cga att gac ttc gaa tct gga cgg ata aag     2208
Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
                725                 730                 735

aag gat gag ttc gct gag atc atg aag atc tgt tcc acc att gaa gag     2256
Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
            740                 745                 750

ctc aga cgg caa aaa tag                                            2274
Leu Arg Arg Gln Lys
        755
```

<210> 4
<211> 757
<212> PRT
<213> Influenza virus

<400> 4

```
Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1               5                   10                  15

Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
            20                  25                  30

Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
        35                  40                  45

Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
    50                  55                  60

Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65                  70                  75                  80

Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
                85                  90                  95

Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
            100                 105                 110
```

Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
115 120 125

Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
130 135 140

Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145 150 155 160

Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
165 170 175

Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
180 185 190

Asp Asn Met Thr Lys Arg Met Val Thr Gln Arg Thr Ile Gly Lys Lys
195 200 205

Lys Gln Arg Leu Asn Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
210 215 220

Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225 230 235 240

Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
245 250 255

Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
260 265 270

Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
275 280 285

Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
290 295 300

Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305 310 315 320

Met Ile Thr Tyr Ile Thr Arg Asn Gln Pro Glu Trp Phe Arg Asn Val

325 330 335

Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
340 345 350

Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
355 360 365

Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
370 375 380

Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385 390 395 400

Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
405 410 415

Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
420 425 430

Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
435 440 445

Leu Ile Val Asn Ala Pro Asn His Glu Gly Val Gln Ala Gly Val Asp
450 455 460

Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465 470 475 480

Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
485 490 495

Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
500 505 510

Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
515 520 525

Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
530 535 540

```
Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545                 550                 555                 560

Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
                565                 570                 575

Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
            580                 585                 590

Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
        595                 600                 605

Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
    610                 615                 620

Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625                 630                 635                 640

Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
                645                 650                 655

Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
            660                 665                 670

Ser Ile Leu Asn Thr Ser Gln Arg Gly Val Leu Glu Asp Glu Gln Met
        675                 680                 685

Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
    690                 695                 700

Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705                 710                 715                 720

Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
                725                 730                 735

Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
            740                 745                 750

Leu Arg Arg Gln Lys
        755
```

<210> 5
<211> 2151
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2151)

<400> 5

```
atg gaa gac ttt gtg cga cag tgc ttc aat cca atg atc gtc gag ctt       48
Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1               5                   10                  15

gcg gaa aag gca atg aaa gaa tat gga gag aac ccg aaa atc gaa aca       96
Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
            20                  25                  30

aac aaa ttt gca gca ata tgc act cac ttg gaa gtc tgc ttc atg tac      144
Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
        35                  40                  45

tcg gat ttt cac ttt att aat gaa ctg ggt gag tca gtg gtc ata gag      192
Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
    50                  55                  60

tct ggt gac cca aat gct ctt ttg aaa cac aga ttt gaa atc att gag      240
Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65                  70                  75                  80

ggg aga gat cga aca atg gca tgg aca gta gta aac agc atc tgc aac      288
Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
                85                  90                  95

acc aca aga gct gaa aaa cct aaa ttt ctt cca gat tta tac gac tat      336
Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
            100                 105                 110

aag gag aac aga ttt gtt gaa att ggt gtg aca agg aga gaa gtt cac      384
Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
        115                 120                 125

ata tac tac ctg gag aag gcc aac aaa ata aag tct gag aaa aca cat      432
Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
    130                 135                 140

atc cac att ttc tca ttt aca gga gag gaa atg gct aca aaa gcg gac      480
Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145                 150                 155                 160

tat act ctt gat gaa gag agt aga gcc agg atc aag acc aga cta ttc      528
Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
                165                 170                 175
```

```
acc ata aga caa gaa atg gcc agt aga ggc ctc tgg gat tcc ttt cgt      576
Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
            180                 185                 190

cag tcc gag aga ggc gaa gag aca att gaa gaa aga ttt gaa ata aca      624
Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
        195                 200                 205

ggg acg atg cgc aag ctt gcc aat tac agt ctc cca ccg aac ttc tcc      672
Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
    210                 215                 220

agc ctt gaa aat ttt aga gtc tat gtg gat gga ttc gaa ccg aac ggc      720
Ser Leu Glu Asn Phe Arg Val Tyr Val Asp Gly Phe Glu Pro Asn Gly
225                 230                 235                 240

tgc att gag agt aag ctt tct caa atg tcc aaa gaa gta aat gcc aga      768
Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Arg
                245                 250                 255

atc gaa cca ttt tca aag aca aca ccc cga cca ctc aaa atg cca ggt      816
Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
            260                 265                 270

ggt cca ccc tgc cat cag cga tct aaa ttc ttg cta atg gat gct ctg      864
Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
        275                 280                 285

aaa ctg agc att gag gac cca agt cac gag gga gag gga ata cca cta      912
Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
    290                 295                 300

tat gat gca atc aaa tgc atg aaa act ttc ttt gga tgg aaa gag ccc      960
Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305                 310                 315                 320

agt att gtt aaa cca cat gaa aag ggt ata aac ccg aac tat ctc caa     1008
Ser Ile Val Lys Pro His Glu Lys Gly Ile Asn Pro Asn Tyr Leu Gln
                325                 330                 335

act tgg aag caa gta tta gaa gaa ata caa gac ctt gag aac gaa gaa     1056
Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
            340                 345                 350

agg acc ccc aag acc aag aat atg aaa aaa aca agc caa ttg aaa tgg     1104
Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
        355                 360                 365

gca cta ggt gaa aat atg gca cca gag aaa gtg gat ttt gag gat tgt     1152
Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

aaa gac atc aat gat tta aaa caa tat gac agt gat gag cca gaa gca     1200
Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Ala
```

```
385                 390                 395                 400

agg tct ctt gca agt tgg att caa agt gag ttc aac aaa gct tgt gag     1248
Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

ctg aca gat tca agc tgg ata gag ctc gat gaa att ggg gag gat gtc     1296
Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

gcc cca ata gaa tac att gcg agc atg agg aga aat tat ttt act gct     1344
Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

gag att tcc cat tgt aga gca aca gaa tat ata ata aaa gga gtg tac     1392
Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Ile Lys Gly Val Tyr
    450                 455                 460

atc aac act gct cta ctc aat gca tcc tgt gct gcg atg gat gaa ttt     1440
Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

caa tta att ccg atg ata agt aaa tgc agg acc aaa gaa ggg aga agg     1488
Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

aaa aca aat tta tat gga ttc ata ata aag gga agg tcc cat tta aga     1536
Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

aat gat act gac gtg gtg aac ttt gta agt atg gaa ttt tct ctc act     1584
Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525

gat cca aga ttt gag cca cac aaa tgg gaa aaa tac tgc gtt cta gaa     1632
Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
    530                 535                 540

att gga gac atg ctt cta aga act gct gta ggt caa gtg tca aga ccc     1680
Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545                 550                 555                 560

atg ttt ttg tat gta agg aca aat gga acc tct aaa att aaa atg aaa     1728
Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
                565                 570                 575

tgg gga atg gaa atg agg cgc tgc ctc ctt cag tct ctg caa cag att     1776
Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
            580                 585                 590

gaa agc atg atc gaa gct gag tcc tca gtc aaa gaa aag gac atg acc     1824
Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
        595                 600                 605

aaa gaa ttt ttt gag aac aaa tca gag aca tgg cct ata gga gag tcc     1872
```

```
Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
    610                 615                 620

ccc aaa gga gtg gaa gag ggc tca atc ggg aag gtt tgc agg acc tta     1920
Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625                 630                 635                 640

tta gca aaa tct gtg ttt aac agt tta tat gca tct cca caa ctg gaa     1968
Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
                645                 650                 655

ggg ttt tca gct gaa tct agg aaa tta ctt ctc att gtt cag gct ctt     2016
Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
            660                 665                 670

aag gat gac ctg gaa cct gga acc ttt gat att ggg ggg tta tat gaa     2064
Lys Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
        675                 680                 685

tca att gag gag tgc ctg att aat gat ccc tgg gtt ttg ctt aat gca     2112
Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
    690                 695                 700

tct tgg ttc aac tcc ttc ctt aca cat gca ctg aag tag                 2151
Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705                 710                 715
```

<210> 6
<211> 716
<212> PRT
<213> Influenza virus

<400> 6

```
Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1               5                   10                  15

Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
            20                  25                  30

Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
        35                  40                  45

Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
    50                  55                  60

Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65                  70                  75                  80
```

Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
85 90 95

Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
100 105 110

Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
115 120 125

Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
130 135 140

Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145 150 155 160

Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
165 170 175

Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
180 185 190

Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
195 200 205

Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
210 215 220

Ser Leu Glu Asn Phe Arg Val Tyr Val Asp Gly Phe Glu Pro Asn Gly
225 230 235 240

Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Arg
245 250 255

Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
260 265 270

Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
275 280 285

Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
290 295 300

```
Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305                 310                 315                 320

Ser Ile Val Lys Pro His Glu Lys Gly Ile Asn Pro Asn Tyr Leu Gln
                325                 330                 335

Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
            340                 345                 350

Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
        355                 360                 365

Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Ala
385                 390                 395                 400

Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Ile Lys Gly Val Tyr
    450                 455                 460

Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525
```

Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
530 535 540

Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545 550 555 560

Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
565 570 575

Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
580 585 590

Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
595 600 605

Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
610 615 620

Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625 630 635 640

Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
645 650 655

Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
660 665 670

Lys Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
675 680 685

Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
690 695 700

Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705 710 715

<210> 7
<211> 838
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(657)

<400> 7

```
atg gat tcc aac act gtg tca agc ttt cag gta gac tgt ttt ctt tgg       48
Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1               5                   10                  15

cat gtc cgc aaa cga ttc gca gac caa gaa ctg ggt gat gcc cca ttc       96
His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
            20                  25                  30

ctt gac cgg ctt cgc cga gac cag aag tcc cta agg gga aga ggt agc      144
Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
        35                  40                  45

act ctt ggt ctg gac atc gaa aca gcc act cat gca gga aag cag ata      192
Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
    50                  55                  60

gtg gag cag att ctg gaa aag gaa tca gat gag gca ctt aaa atg acc      240
Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65                  70                  75                  80

att gcc tct gtt cct act tca ctc tac tta act gac atg act ctt gat      288
Ile Ala Ser Val Pro Thr Ser Leu Tyr Leu Thr Asp Met Thr Leu Asp
                85                  90                  95

gag atg tca aga gac tgg ttc atg ctc atg ccc aag caa aaa gta aca      336
Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
            100                 105                 110

ggc tcc cta tgt ata aga atg gac cag gca atc atg gat aag aac atc      384
Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
        115                 120                 125

ata ctt aaa gca aac ttt agt gtg att ttc gaa ggg ctg gaa aca cta      432
Ile Leu Lys Ala Asn Phe Ser Val Ile Phe Glu Gly Leu Glu Thr Leu
    130                 135                 140

ata cta ctt aga gcc ttc acc gaa gaa gga gca gtc gtt ggc gaa att      480
Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145                 150                 155                 160

tca cca tta cct tct ctt cca gga cat act aat gag gat gtc aaa aat      528
Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
                165                 170                 175

gca att ggg gtc ctc atc gga gga ctt aaa tgg aat gat aat acg gtt      576
Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
            180                 185                 190

aga atc tct gaa act cta cag aga ttc gct tgg aga agc agt cat gag      624
```

Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
195 200 205

aat ggg aga cct tca ttc cct tca aag cag aaa tgaaaaatgg agagaacaat 677
Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys
210 215

taagccagaa atttgaagaa ataagatggt tgattgaaga agtgcgacat agattgaaaa 737

atacagaaaa tagttttgaa caaataacat ttatgcaagc cttacaacta ttgcttgaag 797

tagaacaaga gataagaact ttctcgtttc agcttattta a 838

<210> 8
<211> 219
<212> PRT
<213> Influenza virus

<400> 8

Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1 5 10 15

His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
20 25 30

Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
35 40 45

Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
50 55 60

Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65 70 75 80

Ile Ala Ser Val Pro Thr Ser Leu Tyr Leu Thr Asp Met Thr Leu Asp
85 90 95

Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
100 105 110

Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
115 120 125

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

```
Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145                 150                 155                 160

Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
                165                 170                 175

Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
            180                 185                 190

Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
        195                 200                 205

Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys
    210                 215
```

<210> 9
<211> 1497
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1497)

<400> 9

```
atg gcg tct caa ggc acc aaa cga tcc tat gaa cag atg gaa act gat       48
Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1               5                   10                  15

ggg gaa cgc cag aat gca act gaa atc aga gca tct gtc gga agg atg       96
Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
            20                  25                  30

gtg gga gga atc ggc cga ttt tat gtt cag atg tgt act gag ctt aaa      144
Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
        35                  40                  45

cta aac gac cat gaa ggg cgg ctg att cag aac agc ata aca ata gaa      192
Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
    50                  55                  60

agg atg gta ctt tcg gca ttc gac gaa aga aga aac aag tat ctc gag      240
Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65                  70                  75                  80

gag cat ccc agt gct ggg aaa gac cct aag aaa acg gga ggc ccg ata      288
Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
```

```
                85                  90                  95

tac aga agg aaa gat ggg aaa tgg atg agg gaa ctc atc ctc cat gat      336
Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
            100                 105                 110

aaa gaa gaa atc atg aga atc tgg cgt cag gcc aac aat ggt gaa gac      384
Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
        115                 120                 125

gct act gct ggt ctt act cat atg atg atc tgg cac tcc aat ctc aat      432
Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
    130                 135                 140

gac acc aca tac caa aga aca agg gct ctt gtt cgg act ggg atg gat      480
Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145                 150                 155                 160

ccc aga atg tgc tct ctg atg caa ggc tca acc ctc cca cgg aga tct      528
Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
                165                 170                 175

gga gcc gct ggt gct gca gta aaa ggt gtt gga aca atg gta atg gaa      576
Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
            180                 185                 190

ctc atc aga atg atc aaa cgc gga ata aat gat cgg aat ttc tgg aga      624
Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
        195                 200                 205

ggt gaa aat ggt cga aaa acc aga att gct tat gaa aga atg tgc aat      672
Gly Glu Asn Gly Arg Lys Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
    210                 215                 220

atc ctc aaa ggg aaa ttt cag aca gca gca caa cgg gct atg atg gac      720
Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225                 230                 235                 240

cag gtg agg gaa ggc cgc aat cct gga aac gct gag att gag gat ctc      768
Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
                245                 250                 255

att ttc ttg gca cga tca gca ctt att ttg aga gga tca gta gcc cat      816
Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
            260                 265                 270

aaa tca tgc cta cct gcc tgt gtt tat ggc ctt gca ata acc agt ggg      864
Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Ile Thr Ser Gly
        275                 280                 285

tat gac ttt gag aag gaa gga tac tct ctg gtt gga att gat cct ttc      912
Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
    290                 295                 300

aaa cta ctc cag aac agt caa att ttc agt cta atc aga cca aaa gaa      960
```

```
Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305                 310                 315                 320

aac cca gca cac aag agc cag ttg gtg tgg atg gca tgc cat tct gca     1008
Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
                325                 330                 335

gca ttt gag gac ctg aga gtt tta aat ttc att aga gga acc aaa gta     1056
Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
            340                 345                 350

atc cca aga gga cag tta aca acc aga gga gtt caa att gct tca aat     1104
Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
        355                 360                 365

gaa aac atg gag aca ata aat tct agc aca ctt gaa ctg aga agc aaa     1152
Glu Asn Met Glu Thr Ile Asn Ser Ser Thr Leu Glu Leu Arg Ser Lys
    370                 375                 380

tat tgg gca ata agg acc aga agc gga gga aac acc agt caa cag aga     1200
Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385                 390                 395                 400

gca tct gca gga cag ata agt gtg caa cct act ttc tca gta cag aga     1248
Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
                405                 410                 415

aat cta ccc ttt gag aga gcg acc att atg gct gca ttc act ggt aac     1296
Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
            420                 425                 430

act gaa ggg agg act tcc gac atg aga acg gaa atc ata agg atg atg     1344
Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
        435                 440                 445

gaa aat gcc aaa tca gaa gat gtg tct ttc cag ggg cgg gga gtc ttc     1392
Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
    450                 455                 460

gag ctc tcg gac gaa aag gca acg aac ccg atc gtg cct tcc ttt gac     1440
Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465                 470                 475                 480

atg agc aat gaa ggg tct tat ttc ttc gga gac aat gct gag gag ttt     1488
Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
                485                 490                 495

gac agt taa                                                        1497
Asp Ser
```

<210> 10
<211> 498
<212> PRT

<213> Influenza virus

<400> 10

Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1 5 10 15

Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
20 25 30

Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
35 40 45

Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
50 55 60

Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65 70 75 80

Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
85 90 95

Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
100 105 110

Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
115 120 125

Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
130 135 140

Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145 150 155 160

Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
165 170 175

Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
180 185 190

Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
195 200 205

```
Gly Glu Asn Gly Arg Lys Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
    210                 215                 220

Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225                 230                 235                 240

Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
                245                 250                 255

Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
            260                 265                 270

Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Ile Thr Ser Gly
        275                 280                 285

Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
    290                 295                 300

Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305                 310                 315                 320

Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
                325                 330                 335

Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
            340                 345                 350

Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
        355                 360                 365

Glu Asn Met Glu Thr Ile Asn Ser Ser Thr Leu Glu Leu Arg Ser Lys
    370                 375                 380

Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385                 390                 395                 400

Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
                405                 410                 415

Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
            420                 425                 430
```

Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
435 440 445

Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
450 455 460

Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465 470 475 480

Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
485 490 495

Asp Ser

<210> 11
<211> 1413
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1413)

<400> 11
atg aat cca aat caa aag ata ata gca att gga ttt gca tca ttg ggg 48
Met Asn Pro Asn Gln Lys Ile Ile Ala Ile Gly Phe Ala Ser Leu Gly
1 5 10 15

ata tta atc att aat gtc att ctc cat gta gtc agc att ata gta aca 96
Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
20 25 30

gta ctg gtc ctc aat aac aat aga aca gat ctg aac tgc aaa ggg acg 144
Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
35 40 45

atc ata aga aag tac aat gaa aca gta aga gta gaa aaa att act caa 192
Ile Ile Arg Lys Tyr Asn Glu Thr Val Arg Val Glu Lys Ile Thr Gln
50 55 60

tgg tat aat acc agt aca att aag tac ata gag aga cct tca aat gaa 240
Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65 70 75 80

tac tac atg aac aac act gaa cca ctt tgt gag gcc caa ggc ttt gca 288
Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala

```
                85                  90                  95

cca ttt tcc aaa gat aat gga ata cga att ggg tcg aga ggc cat gtt      336
Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
            100                 105                 110

ttt gtg ata aga gaa cct ttt gta tca tgt tcg ccc tca gaa tgt aga      384
Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
        115                 120                 125

acc ttt ttc ctc aca cag ggc tca tta ctc aat gac aaa cat tct aac      432
Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
    130                 135                 140

ggc aca gta aag gac cga agt ccg tat agg act ttg atg agt gtc aaa      480
Gly Thr Val Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145                 150                 155                 160

ata ggg caa tca cct aat gta tat caa gct aga ttt gaa tcg gta gca      528
Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
                165                 170                 175

tgg tca gca aca gca tgc cat gat gga aaa aaa tgg atg aca gtt gga      576
Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
            180                 185                 190

gtc aca ggg ccc gac aat caa gca att gca gta gtg aac tat gga ggt      624
Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
        195                 200                 205

gtt ccg gtt gat att att aat tca tgg gca ggg gat att tta aga acc      672
Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

caa gaa tca tca tgc acc tgc att aaa gga gac tgt tat tgg gta atg      720
Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240

act gat gga ccg gca aat agg caa gct aaa tat agg ata ttc aaa gca      768
Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255

aaa gat gga aga gta att gga cag act gat ata agt ttc aat ggg gga      816
Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

cac ata gag gag tgt tct tgt tac ccc aat gaa ggg aag gtg gaa tgc      864
His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
        275                 280                 285

ata tgc agg gac aat tgg act gga aca aat aga cca gtt ctg gta ata      912
Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Val Leu Val Ile
    290                 295                 300

tct tct gat cta tcg tac aca gtt gga tat ttg tgt gct ggc att ccc      960
```

```
Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

act gac act cct agg gga gag gat agt caa ttc aca ggc tca tgt aca     1008
Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

agt cct ttg gga aat aaa gga tac ggt gta aaa ggt ttc ggg ttt cga     1056
Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
            340                 345                 350

caa gga act gac gta tgg gcc gga agg aca att agt agg act tca aga     1104
Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

tca gga ttc gaa ata ata aaa atc agg aat ggt tgg aca cag aac agt     1152
Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

aaa gac caa atc agg agg caa gtg att atc gat gac cca aat tgg tca     1200
Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

gga tat agc ggt tct ttc aca ttg ccg gtt gaa cta aca aaa aag gga     1248
Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
                405                 410                 415

tgt ttg gtc ccc tgt ttc tgg gtt gaa atg att aga ggt aaa cct gaa     1296
Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
            420                 425                 430

gaa aca aca ata tgg acc tct agt agc tcc att gtg atg tgt gga gta     1344
Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
        435                 440                 445

gat cat aaa att gcc agt tgg tca tgg cac gat gga gct att ctt ccc     1392
Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
    450                 455                 460

ttt gac atc gat aag atg taa                                        1413
Phe Asp Ile Asp Lys Met
465                 470
```

<210> 12
<211> 470
<212> PRT
<213> Influenza virus

<400> 12

```
Met Asn Pro Asn Gln Lys Ile Ile Ala Ile Gly Phe Ala Ser Leu Gly
1               5                   10                  15
```

```
Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
            20                  25                  30

Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
        35                  40                  45

Ile Ile Arg Lys Tyr Asn Glu Thr Val Arg Val Glu Lys Ile Thr Gln
    50                  55                  60

Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65                  70                  75                  80

Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
                85                  90                  95

Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
            100                 105                 110

Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
        115                 120                 125

Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
    130                 135                 140

Gly Thr Val Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145                 150                 155                 160

Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
                165                 170                 175

Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
            180                 185                 190

Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
        195                 200                 205

Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240
```

```
Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255

Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
        275                 280                 285

Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Val Leu Val Ile
    290                 295                 300

Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
            340                 345                 350

Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
                405                 410                 415

Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
            420                 425                 430

Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
        435                 440                 445

Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
    450                 455                 460
```

```
Phe Asp Ile Asp Lys Met
465                 470


<210>  13
<211>  982
<212>  DNA
<213>  Influenza virus


<220>
<221>  CDS
<222>  (1)..(756)

<400>  13
atg agt ctt cta acc gag gtc gaa acg tac gtt ctc tct atc gta cca       48
Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1               5                   10                  15

tca ggc ccc ctc aaa gcc gag atc gcg cag aga ctt gaa gat gtc ttt       96
Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
            20                  25                  30

gca gga aag aac acc gat ctt gag gca ctc atg gaa tgg cta aag aca      144
Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
        35                  40                  45

aga cca atc ctg tca cct ctg act aaa ggg att tta gga ttt gta ttc      192
Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
    50                  55                  60

acg ctc acc gtg ccc agt gag cga gga ctg cag cgt aga cgc ttt gtc      240
Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65                  70                  75                  80

caa aat gcc ctt agt gga aac gga gat cca aac aac atg gac aga gca      288
Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
                85                  90                  95

gta aaa ctg tac agg aag ctt aaa aga gaa ata aca ttc cat ggg gca      336
Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
            100                 105                 110

aaa gag gta gca ctc agc tat tcc act ggt gca cta gcc agc tgc atg      384
Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
        115                 120                 125

gga ctc ata tac aac aga atg gga act gtt aca acc gaa gtg gca ttt      432
Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
    130                 135                 140

ggc ctg gta tgc gcc aca tgt gaa cag att gct gat tcc cag cat cga      480
Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
```

```
145                 150                 155                 160

gct cac agg cag atg gtg aca aca acc aac cca ttg atc aga cat gaa      528
Ala His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
                165                 170                 175

aac aga atg gta tta gcc agt acc acg gct aaa gcc atg gaa cag atg      576
Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
            180                 185                 190

gca gga tcg agt gag cag gca gca gag gcc atg gag gtt gct agt agg      624
Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
        195                 200                 205

gct agg cag atg gta cag gca atg aga acc att ggg acc cac cct agc      672
Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
    210                 215                 220

tcc agt gcc ggt ttg aaa gat gat ctc ctt gaa aat tta cag gcc tac      720
Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225                 230                 235                 240

cag aaa cgg atg gga gtg caa atg cag cga ttc aag tgatcctctc           766
Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
                245                 250

gttattgcag caagtatcat tgggatcttg cacttgatat tgtggattct tgatcgtctt    826

ttcttcaaat tcatttatcg tcgccttaaa tacgggttga aaagagggcc ttctacggaa    886

ggagtacctg agtctatgag ggaagaatat cggcaggaac agcagaatgc tgtggatgtt    946

gacgatggtc attttgtcaa catagagctg gagtaa                              982


<210>  14
<211>  252
<212>  PRT
<213>  Influenza virus

<400>  14

Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1               5                   10                  15


Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
            20                  25                  30


Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
        35                  40                  45


Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
```

50 55 60

Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65 70 75 80

Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
85 90 95

Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
100 105 110

Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
115 120 125

Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
130 135 140

Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145 150 155 160

Ala His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
165 170 175

Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
180 185 190

Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
195 200 205

Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
210 215 220

Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225 230 235 240

Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
245 250

<210> 15
<211> 1698
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1698)

<400> 15

```
atg aag aca acc att att ttg ata cta cta acc cat tgg gcc tac agt       48
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1               5                  10                  15

caa aac cca atc agt ggc aac aac aca gcc aca ctg tgt ctg gga cac       96
Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30

cat gca gta gca aat gga aca ttg gta aaa aca atg agt gat gat caa      144
His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
        35                  40                  45

att gag gtg aca aat gct aca gaa tta gtt cag agc att tca atg ggg      192
Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
    50                  55                  60

aaa ata tgc aac aaa tca tat aga att cta gat gga aga aat tgc aca      240
Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65                  70                  75                  80

tta ata gat gca atg cta gga gac ccc cac tgt gac gcc ttt cag tat      288
Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
                85                  90                  95

gag agt tgg gac ctc ttc ata gaa aga agc aac gct ttc agc aat tgc      336
Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Asn Ala Phe Ser Asn Cys
            100                 105                 110

tac cca tat gac atc cct gac tat gca tcg ctc cga tcc att gta gca      384
Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
        115                 120                 125

tcc tca gga aca ttg gaa ttc aca gca gag gga ttc aca tgg aca ggt      432
Ser Ser Gly Thr Leu Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
    130                 135                 140

gtc act caa aac gga aga agt gga gcc tgc aaa agg gga tca gcc gat      480
Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145                 150                 155                 160

agt ttc ttt agc cga ctg aat tgg cta aca aaa tct gga agc tct tac      528
Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
                165                 170                 175

ccc aca ttg aat gtg aca atg cct aac aat aaa aat ttc gac aag cta      576
Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
            180                 185                 190
```

```
tac atc tgg ggg att cat cac ccg agc tca aat caa gag cag aca aaa      624
Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
        195                 200                 205

ttg tac atc caa gaa tca gga cga gta aca gtc tca aca aaa aga agt      672
Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
    210                 215                 220

caa caa aca ata atc cct aac atc gga tct aga ccg ttg gtc aga ggt      720
Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225                 230                 235                 240

caa tca ggc agg ata agc ata tac tgg acc att gta aaa cct gga gat      768
Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
                245                 250                 255

atc cta atg ata aac agt aat ggc aac tta gtt gca ccg cgg gga tat      816
Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
            260                 265                 270

ttt aaa ttg aaa aca ggg aaa agc tct gta atg aga tca gat gca ccc      864
Phe Lys Leu Lys Thr Gly Lys Ser Ser Val Met Arg Ser Asp Ala Pro
        275                 280                 285

ata gac att tgt gtg tct gaa tgt att aca cca aat gga agc atc tcc      912
Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
    290                 295                 300

aac gac aag cca ttc caa aat gtg aac aaa gtt aca tat gga aaa tgc      960
Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305                 310                 315                 320

cct aag tat atc agg caa aac act tta aag ctg gcc act ggg atg agg     1008
Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
                325                 330                 335

aat gta cca gaa aag caa acc aga gga atc ttt gga gca ata gcg gga     1056
Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
            340                 345                 350

ttc atc gaa aac ggc tgg gaa gga atg gtt gat ggg tgg tat ggg ttc     1104
Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
        355                 360                 365

cga tat caa aac tct gaa gga aca ggg caa gct gca gat cta aag agc     1152
Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
    370                 375                 380

act caa gca gcc atc gac cag att aat gga aag tta aac aga gtg att     1200
Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385                 390                 395                 400

gaa aga acc aat gag aaa ttc cat caa ata gag aag gaa ttc tca gaa     1248
Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
                405                 410                 415
```

```
gta gaa gga aga att cag gac ctg gag aaa tat gta gaa gac acc aaa     1296
Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
            420                 425                 430

ata gac cta tgg tcc tac aat gca gaa ttg ctg gtg gct cta gaa aat     1344
Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
        435                 440                 445

caa cat aca att gac tta aca gat gca gaa atg aat aaa tta ttt gag     1392
Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
    450                 455                 460

aag act aga cgc cag tta aga gaa aac gca gaa gac atg gga ggt gga     1440
Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465                 470                 475                 480

tgt ttc aag att tac cac aaa tgt gat aat gca tgc att gga tca ata     1488
Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Gly Ser Ile
                485                 490                 495

aga act ggg aca tat gac cat tac ata tac aga gat gaa gca tta aac     1536
Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Arg Asp Glu Ala Leu Asn
            500                 505                 510

aac cga ttt cag atc aaa ggt gta gag ttg aaa tca ggc tac aaa gat     1584
Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
        515                 520                 525

tgg ata ttg tgg att tca ttc gcc ata tca tgc ttc tta att tgc gtt     1632
Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
    530                 535                 540

gtt cta ttg ggt ttc att atg tgg gct tgc caa aga ggc aac atc aga     1680
Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Arg Gly Asn Ile Arg
545                 550                 555                 560

tgc aac att tgc att tga                                            1698
Cys Asn Ile Cys Ile
                565
```

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

<400> 16

```
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1               5                   10                  15

Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30
```

His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
35 40 45

Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
50 55 60

Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65 70 75 80

Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
85 90 95

Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Asn Ala Phe Ser Asn Cys
100 105 110

Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
115 120 125

Ser Ser Gly Thr Leu Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
130 135 140

Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145 150 155 160

Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
165 170 175

Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
180 185 190

Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
195 200 205

Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
210 215 220

Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225 230 235 240

Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp

245 250 255

Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
260 265 270

Phe Lys Leu Lys Thr Gly Lys Ser Ser Val Met Arg Ser Asp Ala Pro
275 280 285

Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
290 295 300

Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305 310 315 320

Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
325 330 335

Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
340 345 350

Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
355 360 365

Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
370 375 380

Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385 390 395 400

Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
405 410 415

Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
420 425 430

Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
435 440 445

Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
450 455 460

```
Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465                 470                 475                 480

Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Gly Ser Ile
                485                 490                 495

Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Arg Asp Glu Ala Leu Asn
            500                 505                 510

Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
        515                 520                 525

Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
    530                 535                 540

Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Arg Gly Asn Ile Arg
545                 550                 555                 560

Cys Asn Ile Cys Ile
                565
```

<210> 17
<211> 2277
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2277)

<400> 17

```
atg gag aga ata aaa gaa ctg aga gat ctg atg tta caa tcc cgc acc       48
Met Glu Arg Ile Lys Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1               5                   10                  15

cgc gag ata cta aca aaa act act gtg gac cac atg gcc ata atc aag       96
Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
            20                  25                  30

aaa tac aca tca gga aga caa gag aag aac cct gca ctt agg atg aaa      144
Lys Tyr Thr Ser Gly Arg Gln Glu Lys Asn Pro Ala Leu Arg Met Lys
        35                  40                  45

tgg atg atg gca atg aaa tac cca att aca gca gat aag agg ata atg      192
Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
    50                  55                  60
```

```
gag atg att cct gag aga aat gaa cag gga caa acc ctt tgg agc aaa      240
Glu Met Ile Pro Glu Arg Asn Glu Gln Gly Gln Thr Leu Trp Ser Lys
65                  70                  75                  80

acg aac gat gct ggc tca gac cgc gta atg gta tca cct ctg gca gtg      288
Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
                85                  90                  95

aca tgg tgg aat agg aat gga cca aca acg agc aca att cat tat cca      336
Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Ser Thr Ile His Tyr Pro
            100                 105                 110

aaa gtc tac aaa act tat ttt gaa aag gtt gaa aga ttg aaa cac gga      384
Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
        115                 120                 125

acc ttt ggc ccc gtt cat ttt agg aat caa gtc aag ata aga cga aga      432
Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
    130                 135                 140

gtt gat gta aac cct ggt cac gcg gac ctc agt gcc aaa gaa gca caa      480
Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145                 150                 155                 160

gat gtg atc atg gaa gtt gtt ttc cca aat gaa gtg gga gcc aga att      528
Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Arg Ile
                165                 170                 175

cta aca tcg gaa tca caa cta aca ata acc aaa gag aaa aag gaa gaa      576
Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
            180                 185                 190

ctt cag gac tgc aaa att gct ccc ttg atg gta gca tac atg cta gaa      624
Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
        195                 200                 205

aga gag ttg gtc cga aaa aca agg ttc ctc cca gta gca ggc gga aca      672
Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Ala Gly Gly Thr
    210                 215                 220

agc agt gta tac att gaa gtg ttg cat ctg act cag gga aca tgc tgg      720
Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225                 230                 235                 240

gag caa atg tac acc cca gga gga gaa gtt aga aac gat gat att gat      768
Glu Gln Met Tyr Thr Pro Gly Gly Glu Val Arg Asn Asp Asp Ile Asp
                245                 250                 255

caa agt tta att att gca gcc cgg aac ata gtg aga aga gcg aca gta      816
Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
            260                 265                 270

tca gca gat cca cta gca tcc cta ctg gaa atg tgc cac agt aca cag      864
Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
        275                 280                 285
```

```
att ggt gga ata agg atg gta gac atc ctt aag cag aat cca aca gag      912
Ile Gly Gly Ile Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
    290                 295                 300

gaa caa gct gtg gat ata tgc aaa gca gca atg gga ttg aga att agc      960
Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305                 310                 315                 320

tca tca ttc agc ttt ggt gga ttc acc ttc aaa aga aca agt gga tca     1008
Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
                325                 330                 335

tca gtc aag aga gaa gaa gaa atg ctt acg ggc aac ctt caa aca ttg     1056
Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
            340                 345                 350

aaa ata aga gtg cat gag ggc tat gaa gaa ttc aca atg gtc gga aga     1104
Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
        355                 360                 365

aga gca aca gcc att atc aga aag gca acc aga aga ttg att caa ttg     1152
Arg Ala Thr Ala Ile Ile Arg Lys Ala Thr Arg Arg Leu Ile Gln Leu
    370                 375                 380

ata gta agt ggg aga gat gaa caa tca att gct gaa gca ata att gta     1200
Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385                 390                 395                 400

gcc atg gtg ttt tcg caa gaa gat tgc atg ata aaa gca gtt cga ggc     1248
Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
                405                 410                 415

gat ttg aac ttt gtt aat aga gca aat cag cgt ttg aac ccc atg cat     1296
Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
            420                 425                 430

caa ctc ttg agg cat ttc caa aaa gat gca aaa gtg ctt ttc caa aat     1344
Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe Gln Asn
        435                 440                 445

tgg gga att gaa ccc atc gac aat gta atg ggg atg att gga ata ttg     1392
Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
    450                 455                 460

cct gac atg acc cca agc acc gag atg tca ttg aga gga gtg aga gtc     1440
Pro Asp Met Thr Pro Ser Thr Glu Met Ser Leu Arg Gly Val Arg Val
465                 470                 475                 480

agc aaa atg gga gtg gat gag tac tcc agc act gag aga gtg gtg gtg     1488
Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
                485                 490                 495

agc att gac cgt ttt tta aga gtt cgg gat caa agg gga aac ata cta     1536
Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
```

```
                500                 505                 510

ctg tcc cct gaa gaa gtc agt gaa aca caa gga acg gaa aag ctg aca     1584
Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
        515                 520                 525

ata att tat tcg tca tca atg atg tgg gag att aat ggt ccc gaa tca     1632
Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
    530                 535                 540

gtg ttg gtc aat act tat caa tgg atc atc agg aac tgg gaa att gta     1680
Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545                 550                 555                 560

aaa att cag tgg tca cag gac ccc aca atg tta tac aat aag ata gaa     1728
Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
                565                 570                 575

ttt gag cca ttc caa tcc ctg gtc cct agg gcc acc aga agc caa tac     1776
Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
            580                 585                 590

agc ggt ttc gta aga acc ctg ttt cag caa atg cga gat gta ctt gga     1824
Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
        595                 600                 605

aca ttt gat act gct caa ata ata aaa ctc ctc cct ttt gcc gct gct     1872
Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
    610                 615                 620

cct ccg gaa cag agt agg atg cag ttc tct tct ttg act gtt aat gta     1920
Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625                 630                 635                 640

aga ggt tcg gga atg agg ata ctt gta aga ggc aat tcc cca gtg ttc     1968
Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
                645                 650                 655

aac tac aat aaa gcc act aaa agg ctc aca gtc ctc gga aag gat gca     2016
Asn Tyr Asn Lys Ala Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
            660                 665                 670

ggt gcg ctt act gag gac cca gat gaa ggt acg gct gga gta gaa tct     2064
Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
        675                 680                 685

gct gtt cta aga ggg ttt ctc att tta ggt aaa gaa aac aag aga tat     2112
Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
    690                 695                 700

ggc cca gca cta agc atc aat gaa cta agc aaa ctt gca aaa ggg gag     2160
Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705                 710                 715                 720

aaa gcc aat gta cta att ggg caa ggg gac rta gtg ttg gta atg aaa     2208
```

```
Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Xaa Val Leu Val Met Lys
                725                 730                 735

cgg aaa cgt gac tct agc ata ctt act gac agc cag aca gcg acc aaa      2256
Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
            740                 745                 750

agg att cgg atg gcc atc aat                                         2277
Arg Ile Arg Met Ala Ile Asn
        755
```

<210> 18
<211> 759
<212> PRT
<213> Influenza virus

<220>
<221> misc_feature
<222> (731)..(731)
<223> The 'Xaa' at location 731 stands for Val, or Ile.

<400> 18

```
Met Glu Arg Ile Lys Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1               5                   10                  15

Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
            20                  25                  30

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

Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
    50                  55                  60

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

Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
                85                  90                  95

Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Ser Thr Ile His Tyr Pro
            100                 105                 110

Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
        115                 120                 125
```

```
Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
    130                 135                 140

Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145                 150                 155                 160

Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Arg Ile
                165                 170                 175

Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
            180                 185                 190

Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
        195                 200                 205

Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Ala Gly Gly Thr
    210                 215                 220

Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225                 230                 235                 240

Glu Gln Met Tyr Thr Pro Gly Gly Glu Val Arg Asn Asp Asp Ile Asp
                245                 250                 255

Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
            260                 265                 270

Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
        275                 280                 285

Ile Gly Gly Ile Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
    290                 295                 300

Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305                 310                 315                 320

Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
                325                 330                 335

Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
            340                 345                 350
```

Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
355 360 365

Arg Ala Thr Ala Ile Ile Arg Lys Ala Thr Arg Arg Leu Ile Gln Leu
370 375 380

Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385 390 395 400

Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
405 410 415

Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
420 425 430

Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe Gln Asn
435 440 445

Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
450 455 460

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

Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
485 490 495

Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
500 505 510

Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
515 520 525

Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
530 535 540

Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545 550 555 560

Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu

565 570 575

Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
580 585 590

Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
595 600 605

Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
610 615 620

Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625 630 635 640

Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
645 650 655

Asn Tyr Asn Lys Ala Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
660 665 670

Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
675 680 685

Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
690 695 700

Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705 710 715 720

Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Xaa Val Leu Val Met Lys
725 730 735

Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
740 745 750

Arg Ile Arg Met Ala Ile Asn
755

<210> 19
<211> 2274
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2274)

<400> 19

```
atg gat gtc aat ccg act cta ctt ttc tta aag gtg cca gcg caa aat       48
Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1               5                   10                  15

gct ata agc aca aca ttc cct tat act gga gat cct ccc tac agt cat       96
Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
            20                  25                  30

gga aca ggg aca gga tac acc atg gat act gtc aac aga aca cac caa      144
Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
        35                  40                  45

tat tca gaa aaa ggg aaa tgg aca aca aac act gag att gga gca cca      192
Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
    50                  55                  60

caa ctt aat cca atc gat gga cca ctt cct gaa gac aat gaa cca agt      240
Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65                  70                  75                  80

ggg tac gcc caa aca gat tgt gta ttg gaa gca atg gct ttc ctt gaa      288
Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
                85                  90                  95

gaa tcc cat ccc gga atc ttt gaa aat tcg tgt ctt gaa acg atg gag      336
Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
            100                 105                 110

gtg att cag cag aca aga gtg gac aaa cta aca caa ggc cga caa act      384
Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
        115                 120                 125

tat gat tgg acc ttg aat agg aat caa cct gcc gca aca gca ctt gct      432
Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
    130                 135                 140

aat acg att gaa gta ttc aga tca aat ggt ctg act tcc aat gaa tcg      480
Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145                 150                 155                 160

ggg aga ttg atg gac ttc ctc aaa gat gtc atg gag tcc atg aac aag      528
Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
                165                 170                 175

gaa gaa atg gaa ata aca aca cac ttc caa cgg aag aga aga gta aga      576
Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
            180                 185                 190
```

```
gac aac atg aca aag aga atg gta aca cag aga acc ata ggg aag aaa      624
Asp Asn Met Thr Lys Arg Met Val Thr Gln Arg Thr Ile Gly Lys Lys
        195                 200                 205

aaa caa cga tta aac aga aag agc tat cta atc aga aca tta acc cta      672
Lys Gln Arg Leu Asn Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
    210                 215                 220

aac aca atg acc aag gac gct gag aga ggg aaa ttg aaa cga cga gca      720
Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225                 230                 235                 240

atc gct acc cca ggg atg cag ata aga ggg ttt gta tat ttt gtt gaa      768
Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
                245                 250                 255

aca cta gcc cga aga ata tgt gaa aag ctt gaa caa tca gga ttg cca      816
Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
            260                 265                 270

gtt ggc ggt aat gag aaa aag gcc aaa ctg gct aat gtc gtc aga aaa      864
Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
        275                 280                 285

atg atg act aat tcc caa gac act gaa ctc tcc ttc acc atc act ggg      912
Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
    290                 295                 300

gac aat acc aaa tgg aat gaa aat cag aac cca cgc ata ttc ctg gca      960
Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305                 310                 315                 320

atg atc aca tac ata act aga aac cag cca gaa tgg ttc aga aat gtt     1008
Met Ile Thr Tyr Ile Thr Arg Asn Gln Pro Glu Trp Phe Arg Asn Val
                325                 330                 335

cta agc att gca ccg att atg ttc tca aat aaa atg gca aga ctg ggg     1056
Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
            340                 345                 350

aaa gga tat atg ttt gaa agc aaa agt atg aaa ttg aga act caa ata     1104
Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
        355                 360                 365

cca gca gaa atg cta gca agc att gac cta aaa tat ttc aat gat tca     1152
Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
    370                 375                 380

aca aaa aag aaa att gaa aag ata cga cca ctt ctg gtt gac ggg act     1200
Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385                 390                 395                 400

gct tca ctg agt cct ggc atg atg atg gga atg ttc aac atg ttg agc     1248
Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
                405                 410                 415
```

```
act gtg ctg ggt gta tcc ata tta aac ctg ggc cag agg aaa tac aca      1296
Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
            420                 425                 430

aag acc aca tac tgg tgg gat ggt ctg caa tca tcc gat gac ttt gct      1344
Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
        435                 440                 445

ttg ata gtg aat gcg cct aat cat gaa gga ata caa gct gga gta gac      1392
Leu Ile Val Asn Ala Pro Asn His Glu Gly Ile Gln Ala Gly Val Asp
    450                 455                 460

aga ttc tat aga act tgc aaa ctg gtc ggg atc aac atg agc aaa aag      1440
Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465                 470                 475                 480

aaa tcc tac ata aat aga act gga aca ttc gaa ttc aca agc ttt ttc      1488
Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
                485                 490                 495

tac cgg tat ggt ttt gta gcc aat ttc agc atg gaa cta ccc agt ttt      1536
Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
            500                 505                 510

ggg gtt tcc gga ata aat gaa tct gca gac atg agc att gga gtg aca      1584
Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
        515                 520                 525

gtc atc aaa aac aac atg ata aat aat gat ctc ggt cct gcc acg gca      1632
Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
    530                 535                 540

caa atg gca ctc caa ctc ttc att aag gat tat cgg tac aca tac cgg      1680
Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545                 550                 555                 560

tgc cat aga ggt gat acc cag ata caa acc aga aga tct ttt gag ttg      1728
Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
                565                 570                 575

aag aaa ctg tgg gaa cag act cga tca aag act ggt cta ctg gta tca      1776
Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
            580                 585                 590

gat ggg ggt cca aac cta tat aac atc aga aac cta cac atc ccg gaa      1824
Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
        595                 600                 605

gtc tgt tta aaa tgg gag cta atg gat gaa gat tat aag ggg agg cta      1872
Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
    610                 615                 620

tgc aat cca ttg aat cct ttc gtt agt cac aaa gaa att gaa tca gtc      1920
Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
```

625 630 635 640

aac agt gca gta gta atg cct gcg cat ggc cct gcc aaa agc atg gag 1968
Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
645 650 655

tat gat gct gtt gca aca aca cat tct tgg atc ccc aag agg aac cgg 2016
Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
660 665 670

tcc ata ttg aac aca agc caa agg gga ata ctc gaa gat gag cag atg 2064
Ser Ile Leu Asn Thr Ser Gln Arg Gly Ile Leu Glu Asp Glu Gln Met
675 680 685

tat cag aaa tgc tgc aac ctg ttt gaa aaa ttc ttc ccc agc agc tca 2112
Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
690 695 700

tac aga aga cca gtc gga att tct agt atg gtt gag gcc atg gtg tcc 2160
Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705 710 715 720

agg gcc cgc att gat gca cga att gac ttc gaa tct gga cgg ata aag 2208
Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
725 730 735

aag gat gag ttc gct gag atc atg aag atc tgt tcc acc att gaa gag 2256
Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
740 745 750

ctc aga cgg caa aaa tag 2274
Leu Arg Arg Gln Lys
755

<210> 20
<211> 757
<212> PRT
<213> Influenza virus

<400> 20

Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1 5 10 15

Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
20 25 30

Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
35 40 45

Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro

50 55 60

Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65 70 75 80

Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
85 90 95

Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
100 105 110

Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
115 120 125

Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
130 135 140

Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145 150 155 160

Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
165 170 175

Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
180 185 190

Asp Asn Met Thr Lys Arg Met Val Thr Gln Arg Thr Ile Gly Lys Lys
195 200 205

Lys Gln Arg Leu Asn Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
210 215 220

Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225 230 235 240

Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
245 250 255

Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
260 265 270

Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
275 280 285

Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
290 295 300

Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305 310 315 320

Met Ile Thr Tyr Ile Thr Arg Asn Gln Pro Glu Trp Phe Arg Asn Val
325 330 335

Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
340 345 350

Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
355 360 365

Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
370 375 380

Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385 390 395 400

Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
405 410 415

Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
420 425 430

Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
435 440 445

Leu Ile Val Asn Ala Pro Asn His Glu Gly Ile Gln Ala Gly Val Asp
450 455 460

Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465 470 475 480

Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
485 490 495

Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
500 505 510

Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
515 520 525

Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
530 535 540

Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545 550 555 560

Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
565 570 575

Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
580 585 590

Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
595 600 605

Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
610 615 620

Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625 630 635 640

Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
645 650 655

Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
660 665 670

Ser Ile Leu Asn Thr Ser Gln Arg Gly Ile Leu Glu Asp Glu Gln Met
675 680 685

Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
690 695 700

Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705 710 715 720

Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
725 730 735

Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
740 745 750

Leu Arg Arg Gln Lys
755

<210> 21
<211> 2151
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2151)

<400> 21
atg gaa gac ttt gtg cga cag tgc ttc aat cca atg atc gtc gag ctt 48
Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1 5 10 15

gcg gaa aag gca atg aaa gaa tat gga gag aac ccg aaa atc gaa aca 96
Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
20 25 30

aac aaa ttt gca gca ata tgc act cac ttg gaa gtc tgc ttc atg tac 144
Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
35 40 45

tcg gat ttt cac ttt att aat gaa ctg ggt gag tca gtg gtc ata gag 192
Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
50 55 60

tct ggt gac cca aat gct ctt ttg aaa cac aga ttt gaa atc att gag 240
Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65 70 75 80

ggg aga gat cga aca atg gca tgg aca gta gta aac agc atc tgc aac 288
Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
85 90 95

acc aca aga gct gaa aaa cct aaa ttt ctt cca gat tta tac gac tat 336
Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
100 105 110

aag gag aac aga ttt gtt gaa att ggt gtg aca agg aga gaa gtt cac 384
Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His

```
        115                 120                 125

ata tac tac ctg gag aag gcc aac aaa ata aag tct gag aaa aca cat      432
Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
    130                 135                 140

atc cac att ttc tca ttt aca gga gag gaa atg gct aca aaa gcg gac      480
Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145                 150                 155                 160

tat act ctt gat gaa gag agt aga gcc agg atc aag acc aga cta ttc      528
Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
                165                 170                 175

act ata aga caa gaa atg gcc agt aga ggc ctc tgg gat tcc ttt cgt      576
Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
            180                 185                 190

cag tcc gag aga ggc gaa gag aca att gaa gaa aga ttt gaa atc aca      624
Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
        195                 200                 205

ggg acg atg cgc aag ctt gcc aat tac agt ctc cca ccg aac ttc tcc      672
Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
    210                 215                 220

agc ctt gaa aat ttt aga gtc tat gtg gat gga ttc gaa ccg aac ggc      720
Ser Leu Glu Asn Phe Arg Val Tyr Val Asp Gly Phe Glu Pro Asn Gly
225                 230                 235                 240

tgc att gag agt aag ctt tct caa atg tcc aaa gaa gta aat gcc aga      768
Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Arg
                245                 250                 255

atc gaa cca ttt tca aag aca aca ccc cga cca ctc aaa atg cca ggt      816
Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
            260                 265                 270

ggt cca ccc tgc cat cag cga tct aaa ttc ttg cta atg gat gct ctg      864
Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
        275                 280                 285

aaa ctg agc att gag gac cca agt cac gag gga gag gga ata cca cta      912
Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
    290                 295                 300

tat gat gca atc aaa tgc atg aaa act ttc ttt gga tgg aaa gag ccc      960
Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305                 310                 315                 320

agt att gtt aaa cca cat gaa aag ggt ata aac ccg aac tat ctc caa     1008
Ser Ile Val Lys Pro His Glu Lys Gly Ile Asn Pro Asn Tyr Leu Gln
                325                 330                 335

act tgg aag caa gta tta gaa gaa ata caa gac ctt gag aac gaa gaa     1056
```

```
Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
            340                 345                 350

agg acc ccc aag acc aag aat atg aaa aaa aca agc caa ttg aaa tgg      1104
Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
        355                 360                 365

gca cta ggt gaa aat atg gca cca gag aaa gtg gat ttt gag gat tgt      1152
Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

aaa gac atc aat gat tta aaa caa tat gac agt gat gag cca gaa aca      1200
Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Thr
385                 390                 395                 400

agg tct ctt gca agt tgg att caa agt gag ttc aac aaa gct tgt gag      1248
Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

ctg aca gat tca agc tgg ata gag ctc gat gaa att ggg gag gat gtc      1296
Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

gcc cca ata gaa tac att gcg agc atg agg aga aat tat ttt act gct      1344
Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

gag att tcc cat tgt aga gca aca gaa tat ata atg aaa gga gtg tac      1392
Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Met Lys Gly Val Tyr
    450                 455                 460

atc aac act gct cta ctc aat gca tcc tgt gct gcg atg gat gaa ttt      1440
Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

caa tta att ccg atg ata agt aaa tgc agg acc aaa gaa ggg aga agg      1488
Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

aaa aca aat tta tat gga ttc ata ata aag gga agg tcc cat tta aga      1536
Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

aat gat act gac gtg gtg aac ttt gta agt atg gaa ttt tct ctc act      1584
Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525

gat cca aga ttt gag cca cac aaa tgg gaa aaa tac tgc gtt cta gaa      1632
Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
    530                 535                 540

att gga gac atg ctt cta aga act gct gta ggt caa gtg tca aga ccc      1680
Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545                 550                 555                 560
```

```
atg ttt ttg tat gta agg aca aat gga acc tct aaa att aaa atg aaa      1728
Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
                565                 570                 575

tgg gga atg gaa atg agg cgc tgc ctc ctt cag tct ctg caa cag att      1776
Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
            580                 585                 590

gaa agc atg atc gaa gct gag tcc tca gtc aaa gaa aag gac atg acc      1824
Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
        595                 600                 605

aaa gaa ttt ttt gag aac aaa tca gag aca tgg cct ata gga gag tcc      1872
Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
    610                 615                 620

ccc aaa gga gtg gaa gag ggc tca atc ggg aag gtt tgc agg acc tta      1920
Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625                 630                 635                 640

tta gca aaa tct gtg ttt aac agt tta tat gca tct cca caa ctg gaa      1968
Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
                645                 650                 655

ggg ttt tca gct gaa tct agg aaa tta ctt ctc att gtt cag gct ctt      2016
Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
            660                 665                 670

agg gat gac ctg gaa cct gga acc ttt gat att ggg ggg tta tat gaa      2064
Arg Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
        675                 680                 685

tca att gag gag tgc ctg att aat gat ccc tgg gtt ttg ctt aat gca      2112
Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
    690                 695                 700

tct tgg ttc aac tcc ttc ctt aca cat gca ctg aag tag                  2151
Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705                 710                 715
```

<210> 22
<211> 716
<212> PRT
<213> Influenza virus

<400> 22

```
Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1               5                   10                  15

Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
            20                  25                  30
```

Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
35 40 45

Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
50 55 60

Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65 70 75 80

Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
85 90 95

Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
100 105 110

Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
115 120 125

Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
130 135 140

Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145 150 155 160

Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
165 170 175

Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
180 185 190

Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
195 200 205

Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
210 215 220

Ser Leu Glu Asn Phe Arg Val Tyr Val Asp Gly Phe Glu Pro Asn Gly
225 230 235 240

Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Arg
245 250 255

Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
260 265 270

Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
275 280 285

Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
290 295 300

Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305 310 315 320

Ser Ile Val Lys Pro His Glu Lys Gly Ile Asn Pro Asn Tyr Leu Gln
325 330 335

Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
340 345 350

Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
355 360 365

Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
370 375 380

Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Thr
385 390 395 400

Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
405 410 415

Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
420 425 430

Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
435 440 445

Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Met Lys Gly Val Tyr
450 455 460

Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe

465 470 475 480

Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
485 490 495

Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
500 505 510

Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
515 520 525

Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
530 535 540

Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545 550 555 560

Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
565 570 575

Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
580 585 590

Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
595 600 605

Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
610 615 620

Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625 630 635 640

Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
645 650 655

Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
660 665 670

Arg Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
675 680 685

```
Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
    690                 695                 700

Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705                 710                 715

<210>  23
<211>  838
<212>  DNA
<213>  Influenza virus

<220>
<221>  CDS
<222>  (1)..(657)

<400>  23
atg gat tcc aac act gtg tca agc ttt cag gta gac tgt ttt ctt tgg      48
Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1               5                   10                  15

cat gtc cgc aaa cga ttc gca gac caa gaa ctg ggt gat gcc cca ttc      96
His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
            20                  25                  30

ctt gac cgg ctt cgc cga gac cag aag tcc cta agg gga aga ggt agc     144
Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
        35                  40                  45

act ctt ggt ctg gac atc gaa aca gcc act cat gca gga aag cag ata     192
Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
    50                  55                  60

gtg gag cag att ctg gaa aag gaa tca gat gag gca ctt aaa atg acc     240
Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65                  70                  75                  80

att gcc tct gtt cct act tca cgc tac tta act gac atg act ctt gat     288
Ile Ala Ser Val Pro Thr Ser Arg Tyr Leu Thr Asp Met Thr Leu Asp
                85                  90                  95

gag atg tca aga gac tgg ttc atg ctc atg ccc aag caa aaa gta aca     336
Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
            100                 105                 110

ggc tcc cta tgt ata aga atg gac cag gca atc atg gat aag aac atc     384
Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
        115                 120                 125

ata ctt aaa gca aac ttt agt gtg att ttc gaa ggg ctg gaa aca cta     432
Ile Leu Lys Ala Asn Phe Ser Val Ile Phe Glu Gly Leu Glu Thr Leu
    130                 135                 140
```

```
ata cta ctt aga gcc ttc acc gaa gaa gga gca gtc gtt ggc gaa att      480
Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145                 150                 155                 160

tca cca tta cct tct ctt cca gga cat act aat gag gat gtc aaa aat      528
Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
                165                 170                 175

gca att ggg gtc ctc atc gga gga ctt aaa tgg aat gat aat acg gtt      576
Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
            180                 185                 190

aga atc tct gaa act cta cag aga ttc gct tgg aga agc agt cat gag      624
Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
        195                 200                 205

aat ggg aga cct tca ttc cct tca aag cag aaa tgaaaaatgg agagaacaat    677
Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys
    210                 215

taagccagaa atttgaagaa ataagatggt tgattgaaga agtgcgacat agattgaaaa    737

atacagaaaa tagttttgaa caaataacat ttatgcaagc cttacaacta ttgcttgaag    797

tagaacaaga gataagaact ttctcgtttc agcttattta a                       838
```

<210> 24
<211> 219
<212> PRT
<213> Influenza virus

<400> 24

```
Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1               5                   10                  15

His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
            20                  25                  30

Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
        35                  40                  45

Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
    50                  55                  60

Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65                  70                  75                  80

Ile Ala Ser Val Pro Thr Ser Arg Tyr Leu Thr Asp Met Thr Leu Asp
```

85 90 95

Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
100 105 110

Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
115 120 125

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

Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145 150 155 160

Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
165 170 175

Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
180 185 190

Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
195 200 205

Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys
210 215

<210> 25
<211> 1497
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1497)

<400> 25
atg gcg tct caa ggc acc aaa cga tcc tat gaa cag atg gaa act gat 48
Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1 5 10 15

ggg gaa cgc cag aat gca act gaa atc aga gca tct gtc gga agg atg 96
Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
20 25 30

gtg gga gga atc ggc cgg ttt tat gtt cag atg tgt act gag ctt aaa 144

```
Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
        35                  40                  45

cta aac gac cat gaa ggg cgg ctg att cag aac agc ata aca ata gaa      192
Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
    50                  55                  60

agg atg gta ctt tcg gca ttc gac gaa aga aga aac aag tat ctc gag      240
Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65                  70                  75                  80

gag cat ccc agt gct ggg aaa gac cct aag aaa acg gga ggc ccg ata      288
Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
                85                  90                  95

tac aga agg aaa gat ggg aaa tgg atg agg gaa ctc atc ctc cat gat      336
Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
            100                 105                 110

aaa gaa gaa atc atg aga atc tgg cgt cag gcc aac aat ggt gaa gac      384
Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
        115                 120                 125

gct act gct ggt ctt act cat atg atg atc tgg cac tcc aat ctc aat      432
Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
    130                 135                 140

gac acc aca tac caa aga aca agg gct ctt gtt cgg act ggg atg gat      480
Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145                 150                 155                 160

ccc aga atg tgc tct ctg atg caa ggc tca acc ctc cca cgg aga tct      528
Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
                165                 170                 175

gga gcc gct ggt gct gca gta aaa ggt gtt gga aca atg gta atg gaa      576
Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
            180                 185                 190

ctc atc aga atg atc aaa cgc gga ata aat gat cgg aat ttc tgg aga      624
Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
        195                 200                 205

ggt gaa aat ggt cga aga acc aga att gct tat gaa aga atg tgc aat      672
Gly Glu Asn Gly Arg Arg Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
    210                 215                 220

atc ctc aaa ggg aaa ttt cag aca gca gca caa cgg gct atg atg gac      720
Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225                 230                 235                 240

cag gtg agg gaa ggc cgc aat cct gga aac gct gag att gag gat ctc      768
Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
                245                 250                 255
```

```
att ttc ttg gca cga tca gca ctt att ttg aga gga tca gta gcc cat      816
Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
            260                 265                 270

aaa tca tgc cta cct gcc tgt gtt tat ggc ctt gca gta acc agt ggg      864
Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Val Thr Ser Gly
        275                 280                 285

tat gac ttt gag aag gaa gga tac tct ctg gtt gga att gat cct ttc      912
Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
    290                 295                 300

aaa cta ctc cag aac agt caa att ttc agt cta atc aga cca aaa gaa      960
Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305                 310                 315                 320

aac cca gca cac aag agc cag ttg gtg tgg atg gca tgc cat tct gca     1008
Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
                325                 330                 335

gca ttt gag gac ctg aga gtt tta aat ttc att aga gga acc aaa gta     1056
Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
            340                 345                 350

atc cca aga gga cag tta aca acc aga gga gtt caa att gct tca aat     1104
Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
        355                 360                 365

gaa aac atg gag aca ata gat tct agc aca ctt gaa ctg aga agc aaa     1152
Glu Asn Met Glu Thr Ile Asp Ser Ser Thr Leu Glu Leu Arg Ser Lys
    370                 375                 380

tat tgg gca ata agg acc aga agc gga gga aac acc agt caa cag aga     1200
Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385                 390                 395                 400

gca tct gca gga cag ata agt gtg caa cct act ttc tca gta cag aga     1248
Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
                405                 410                 415

aat ctt ccc ttt gag aga gca acc att atg gct gca ttc act ggt aac     1296
Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
            420                 425                 430

act gaa ggg agg act tcc gac atg aga acg gaa atc ata agg atg atg     1344
Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
        435                 440                 445

gaa aat gcc aaa tca gaa gat gtg tct ttc cag ggg cgg gga gtc ttc     1392
Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
    450                 455                 460

gag ctc tcg gac gaa aag gca acg aac ccg atc gtg cct tcc ttt gac     1440
Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465                 470                 475                 480
```

atg agc aat gaa ggg tct tat ttc ttc gga gac aat gct gag gag ttt 1488
Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
485 490 495

gac agt taa 1497
Asp Ser

<210> 26
<211> 498
<212> PRT
<213> Influenza virus

<400> 26

Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1 5 10 15

Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
20 25 30

Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
35 40 45

Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
50 55 60

Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65 70 75 80

Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
85 90 95

Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
100 105 110

Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
115 120 125

Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
130 135 140

Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145 150 155 160

Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
165 170 175

Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
180 185 190

Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
195 200 205

Gly Glu Asn Gly Arg Arg Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
210 215 220

Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225 230 235 240

Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
245 250 255

Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
260 265 270

Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Val Thr Ser Gly
275 280 285

Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
290 295 300

Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305 310 315 320

Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
325 330 335

Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
340 345 350

Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
355 360 365

Glu Asn Met Glu Thr Ile Asp Ser Ser Thr Leu Glu Leu Arg Ser Lys

370 375 380

Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385 390 395 400

Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
405 410 415

Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
420 425 430

Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
435 440 445

Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
450 455 460

Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465 470 475 480

Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
485 490 495

Asp Ser

<210> 27
<211> 1410
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1410)

<400> 27
atg aat cca aat caa aag ata ata aca att gga ttt gca tca ttg ggg 48
Met Asn Pro Asn Gln Lys Ile Ile Thr Ile Gly Phe Ala Ser Leu Gly
1 5 10 15

ata tta atc att aat gtc att ctc cat gta gtc agc att ata gta aca 96
Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
20 25 30

gta ctg gtc ctc aat aac aat aga aca gat ctg aac tgc aaa ggg acg 144

```
Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
        35                  40                  45

atc ata aga gag tac aat gaa aca gta aga gta gaa aaa att act caa      192
Ile Ile Arg Glu Tyr Asn Glu Thr Val Arg Val Glu Lys Ile Thr Gln
    50                  55                  60

tgg tat aat acc agt aca att aag tac ata gag aga cct tca aat gaa      240
Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65                  70                  75                  80

tac tac atg aac aac act gaa cca ctt tgt gag gcc caa ggc ttt gca      288
Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
                85                  90                  95

cca ttt tcc aaa gat aat gga ata cga att ggg tcg aga ggc cat gtt      336
Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
            100                 105                 110

ttt gtg ata aga gaa cct ttt gta tca tgt tcg ccc tca gaa tgt aga      384
Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
        115                 120                 125

acc ttt ttc ctc aca cag ggc tca tta ctc aat gac aaa cat tct aac      432
Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
    130                 135                 140

ggc aca gta aag gac cga agt ccg tat agg act ttg atg agt gtc aaa      480
Gly Thr Val Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145                 150                 155                 160

ata ggg caa tca cct aat gta tat caa gct agg ttt gaa tcg gtg gca      528
Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
                165                 170                 175

tgg tca gca aca gca tgc cat gat gga aaa aaa tgg atg aca gtt gga      576
Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
            180                 185                 190

gtc aca ggg ccc gac aat caa gca att gca gta gtg aac tat gga ggt      624
Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
        195                 200                 205

gtt ccg gtt gat att att aat tca tgg gca ggg gat att tta aga acc      672
Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

caa gaa tca tca tgc acc tgc att aaa gga gac tgt tat tgg gta atg      720
Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240

act gat gga ccg gca aat agg caa gct aaa tat agg ata ttc aaa gca      768
Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255
```

```
aaa gat gga aga gta att gga cag act gat ata agt ttc aat ggg gga      816
Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

cac ata gag gag tgt tct tgt tac ccc aat gaa ggg aag gtg gaa tgc      864
His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
        275                 280                 285

ata tgc agg gac aat tgg act gga aca aat aga cca att ctg gta ata      912
Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Ile Leu Val Ile
    290                 295                 300

tct tct gat cta tcg tac aca gtt gga tat ttg tgt gct ggc att ccc      960
Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

act gac act cct agg gga gag gat agt caa ttc aca ggc tca tgt aca     1008
Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

agt cct ttg gga aat aaa gga tac ggt gta aaa ggt ttc ggg ttt cga     1056
Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
            340                 345                 350

caa gga act gac gta tgg gcc gga agg aca att agt agg act tca aga     1104
Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

tca gga ttc gaa ata ata aaa atc agg aat ggt tgg aca cag aac agt     1152
Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

aaa gac caa atc agg agg caa gtg att atc gat gac cca aat tgg tca     1200
Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

gga tat agc ggt tct ttc aca ttg ccg gtt gaa cta aca aaa aag gga     1248
Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
                405                 410                 415

tgt ttg gtc ccc tgt ttc tgg gtt gaa atg att aga ggt aaa cct gaa     1296
Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
            420                 425                 430

gaa aca aca ata tgg acc tct agc agc tcc att gtg atg tgt gga gta     1344
Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
        435                 440                 445

gat cat aaa att gcc agt tgg tca tgg cac gat gga gct att ctt ccc     1392
Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
    450                 455                 460

ttt gac atc gat aag atg                                            1410
Phe Asp Ile Asp Lys Met
465                 470
```

<210> 28
<211> 470
<212> PRT
<213> Influenza virus

<400> 28

Met Asn Pro Asn Gln Lys Ile Ile Thr Ile Gly Phe Ala Ser Leu Gly
1 5 10 15

Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
20 25 30

Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
35 40 45

Ile Ile Arg Glu Tyr Asn Glu Thr Val Arg Val Glu Lys Ile Thr Gln
50 55 60

Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65 70 75 80

Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
85 90 95

Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
100 105 110

Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
115 120 125

Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
130 135 140

Gly Thr Val Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145 150 155 160

Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
165 170 175

Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
180 185 190

```
Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
        195                 200                 205

Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240

Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255

Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
        275                 280                 285

Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Ile Leu Val Ile
    290                 295                 300

Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
            340                 345                 350

Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
```

405 410 415

Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
420 425 430

Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
435 440 445

Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
450 455 460

Phe Asp Ile Asp Lys Met
465 470

<210> 29
<211> 982
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(756)

<400> 29
atg agt ctt cta acc gag gtc gaa acg tac gtt ctc tct atc gta cca 48
Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1 5 10 15

tca ggc ccc ctc aaa gcc gag atc gcg cag aga ctt gaa gat gtc ttt 96
Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
20 25 30

gca ggg aag aac acc gat ctt gag gca ctc atg gaa tgg cta aag aca 144
Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
35 40 45

aga cca atc ctg tca cct ctg act aaa ggg att tta gga ttt gta ttc 192
Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
50 55 60

acg ctc acc gtg ccc agt gag cga gga ctg cag cgt aga cgc ttt gtc 240
Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65 70 75 80

caa aat gcc ctt agt gga aac gga gat cca aac aac atg gac aga gca 288
Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
85 90 95

gta aaa ctg tac agg aag ctt aaa aga gaa ata aca ttc cat ggg gca 336

```
Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
            100                 105                 110

aaa gag gtg gca ctc agc tat tcc act ggt gca cta gcc agc tgc atg      384
Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
        115                 120                 125

gga ctc ata tac aac aga atg gga act gtt aca acc gaa gtg gca ttt      432
Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
    130                 135                 140

ggc ctg gta tgc gcc aca tgt gaa cag att gct gat tcc cag cat cga      480
Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145                 150                 155                 160

tct cac agg cag atg gtg aca aca acc aac cca tta atc aga cat gaa      528
Ser His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
                165                 170                 175

aac aga atg gta tta gcc agt acc acg gct aaa gcc atg gaa cag atg      576
Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
            180                 185                 190

gca gga tcg agt gag cag gca gca gag gcc atg gag gtt gct agt agg      624
Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
        195                 200                 205

gct agg cag atg gta cag gca atg aga acc att ggg acc cac cct agc      672
Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
    210                 215                 220

tcc agt gcc ggt ttg aaa gat gat ctc ctt gaa aat tta cag gcc tac      720
Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225                 230                 235                 240

cag aaa cgg atg gga gtg caa atg cag cga ttc aag tgatcctctc           766
Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
                245                 250

gttattgcag caagtatcat tgggatcttg cacttgatat tgtggattct tgatcgtctt    826

ttcttcaaat tcatttatcg tcgccttaaa tacgggttga aaagagggcc ttctacggaa    886

ggagtacctg agtctatgag ggaagaatat cggcaggaac agcagaatgc tgtggatgtt    946

gacgatggtc attttgtcaa catagagctg gagtaa                              982
```

<210> 30
<211> 252
<212> PRT
<213> Influenza virus

<400> 30

Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1 5 10 15

Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
20 25 30

Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
35 40 45

Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
50 55 60

Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65 70 75 80

Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
85 90 95

Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
100 105 110

Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
115 120 125

Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
130 135 140

Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145 150 155 160

Ser His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
165 170 175

Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
180 185 190

Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
195 200 205

Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
210 215 220

```
Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225                 230                 235                 240

Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
                245                 250
```

<210> 31
<211> 1698
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1698)

<400> 31

```
atg aag aca acc att att ttg ata cta ctg acc cat tgg gcc tac agt       48
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1               5                   10                  15

caa aac cca atc agt gac aac aac aca gcc aca ctg tgt ctg gga cac       96
Gln Asn Pro Ile Ser Asp Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30

cat gca gta gca aat gga aca ttg gta aaa aca ata agt gat gat caa      144
His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Ile Ser Asp Asp Gln
        35                  40                  45

att gag gtg aca aat gct aca gaa tta gtt cag agc att tca atg ggg      192
Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
    50                  55                  60

aaa ata tgc aac aaa tca tat aga att cta gat gga aga aat tgc aca      240
Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65                  70                  75                  80

tta ata gat gca atg cta gga gac ccc cac tgt gac gcc ttt cag tat      288
Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
                85                  90                  95

gag agt tgg gac ctc ttt ata gaa aga agc agc gct ttc agc aat tgc      336
Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
            100                 105                 110

tac cca tat gac atc cct gac tat gca tcg ctc cga tcc att gta gca      384
Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
        115                 120                 125

tcc tca gga aca ttg gaa ttc aca gca gag gga ttc aca tgg aca ggt      432
Ser Ser Gly Thr Leu Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
    130                 135                 140
```

```
gtc act caa aac gga aga agt gga gcc tgc aaa agg gga tca gcc gat      480
Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145                 150                 155                 160

agt ttc ttt agc cga ctg aat tgg cta aca aaa tct gga agc tct tac      528
Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
                165                 170                 175

ccc aca ttg aat gtg aca atg cct aac aat aaa aat ttc gac aag cta      576
Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
            180                 185                 190

tac atc tgg ggg att cat cac ccg agc tca aat caa gag cag aca aaa      624
Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
        195                 200                 205

ttg tac atc caa gaa tca gga cga gta aca gtc tca aca aaa aga agt      672
Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
    210                 215                 220

caa caa aca ata atc cct aac atc gga tct aga ccg ttg gtc aga ggt      720
Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225                 230                 235                 240

caa tca ggc agg ata agc ata tac tgg acc att gta aaa cct gga gat      768
Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
                245                 250                 255

atc cta atg ata aac agt aat ggc aac tta gtt gca ccg cgg gga tat      816
Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
            260                 265                 270

ttt aaa ttg aaa aca ggg aaa agc tct gta atg aga tca gat gta ccc      864
Phe Lys Leu Lys Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
        275                 280                 285

ata gac att tgt gtg tct gaa tgt att aca cca aat gga agc atc tcc      912
Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
    290                 295                 300

aac gac aag cca ttc caa aat gtg aac aaa gtt aca tat gga aaa tgc      960
Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305                 310                 315                 320

ccc aag tat atc agg caa aac act tta aag ctg gcc act ggg atg agg     1008
Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
                325                 330                 335

aat gta cca gaa aag caa acc aga gga atc ttt gga gca ata gcg gga     1056
Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
            340                 345                 350

ttc atc gaa aac ggc tgg gaa gga atg gtt gat ggg tgg tat ggg ttc     1104
Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
```

```
        355                 360                 365

cga tat caa aac tct gaa gga aca ggg caa gct gca gat cta aag agc     1152
Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
    370                 375                 380

act caa gca gcc atc gac cag att aat gga aag tta aac aga gtg att     1200
Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385                 390                 395                 400

gaa aga acc aat gag aaa ttc cat caa ata gag aag gaa ttc tca gaa     1248
Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
                405                 410                 415

gta gaa gga aga att cag gac ttg gag aaa tat gta gaa gac acc aaa     1296
Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
            420                 425                 430

ata gac cta tgg tcc tac aat gca gaa ttg ctg gtg gct cta gaa aat     1344
Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
        435                 440                 445

caa cat aca att gac tta aca gat gca gaa atg aat aaa tta ttt gag     1392
Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
    450                 455                 460

aag act aga cgc cag tta aga gaa aac gca gaa gac atg gga ggt gga     1440
Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465                 470                 475                 480

tgt ttc aag att tac cac aaa tgt gat aat gca tgc att gga tca ata     1488
Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Gly Ser Ile
                485                 490                 495

aga act ggg aca tat gac cat tac ata tac aga gat gaa gca tta aac     1536
Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Arg Asp Glu Ala Leu Asn
            500                 505                 510

aac cga ttt cag atc aaa ggt gta gag ttg aaa tca ggc tac aaa gat     1584
Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
        515                 520                 525

tgg ata ctg tgg att tca ttc gcc ata tca tgc ttc tta att tgc gtt     1632
Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
    530                 535                 540

gtt cta ttg ggt ttc att atg tgg gct tgc caa aaa ggc aac atc aga     1680
Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
545                 550                 555                 560

tgc aac att tgc att tga                                            1698
Cys Asn Ile Cys Ile
                565
```

<210> 32
<211> 565
<212> PRT
<213> Influenza virus

<400> 32

Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1 5 10 15

Gln Asn Pro Ile Ser Asp Asn Asn Thr Ala Thr Leu Cys Leu Gly His
20 25 30

His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Ile Ser Asp Asp Gln
35 40 45

Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
50 55 60

Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65 70 75 80

Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
85 90 95

Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
100 105 110

Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
115 120 125

Ser Ser Gly Thr Leu Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
130 135 140

Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145 150 155 160

Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
165 170 175

Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
180 185 190

Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
195 200 205

Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
210 215 220

Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225 230 235 240

Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
245 250 255

Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
260 265 270

Phe Lys Leu Lys Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
275 280 285

Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
290 295 300

Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305 310 315 320

Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
325 330 335

Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
340 345 350

Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
355 360 365

Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
370 375 380

Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385 390 395 400

Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
405 410 415

Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
420 425 430

Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
435 440 445

Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
450 455 460

Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465 470 475 480

Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Gly Ser Ile
485 490 495

Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Arg Asp Glu Ala Leu Asn
500 505 510

Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
515 520 525

Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
530 535 540

Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
545 550 555 560

Cys Asn Ile Cys Ile
565

<210> 33
<211> 549
<212> PRT
<213> Influenza virus

<400> 33

Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
1 5 10 15

His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
20 25 30

Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
35 40 45

Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
50 55 60

Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
65 70 75 80

Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Asn Ala Phe Ser Asn Cys
85 90 95

Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
100 105 110

Ser Ser Gly Thr Leu Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
115 120 125

Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
130 135 140

Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
145 150 155 160

Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
165 170 175

Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
180 185 190

Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
195 200 205

Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
210 215 220

Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
225 230 235 240

Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
245 250 255

Phe Lys Leu Lys Thr Gly Lys Ser Ser Val Met Arg Ser Asp Ala Pro
260 265 270

Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
275 280 285

Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
290 295 300

Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
305 310 315 320

Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
325 330 335

Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
340 345 350

Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
355 360 365

Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
370 375 380

Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
385 390 395 400

Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
405 410 415

Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
420 425 430

Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
435 440 445

Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
450 455 460

Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Gly Ser Ile

465 470 475 480

Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Arg Asp Glu Ala Leu Asn
485 490 495

Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
500 505 510

Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
515 520 525

Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Arg Gly Asn Ile Arg
530 535 540

Cys Asn Ile Cys Ile
545

<210> 34
<211> 549
<212> PRT
<213> Influenza virus

<400> 34

Gln Asn Pro Ile Ser Asp Asn Asn Thr Ala Thr Leu Cys Leu Gly His
1 5 10 15

His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Ile Ser Asp Asp Gln
20 25 30

Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
35 40 45

Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
50 55 60

Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
65 70 75 80

Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
85 90 95

Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala

100 105 110

Ser Ser Gly Thr Leu Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
115 120 125

Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
130 135 140

Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
145 150 155 160

Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
165 170 175

Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
180 185 190

Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
195 200 205

Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
210 215 220

Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
225 230 235 240

Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
245 250 255

Phe Lys Leu Lys Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
260 265 270

Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
275 280 285

Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
290 295 300

Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
305 310 315 320

```
Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
                325                 330                 335

Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
            340                 345                 350

Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
        355                 360                 365

Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
    370                 375                 380

Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
385                 390                 395                 400

Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
                405                 410                 415

Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
            420                 425                 430

Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
        435                 440                 445

Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
    450                 455                 460

Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Gly Ser Ile
465                 470                 475                 480

Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Arg Asp Glu Ala Leu Asn
                485                 490                 495

Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
            500                 505                 510

Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
        515                 520                 525

Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
    530                 535                 540
```

Cys Asn Ile Cys Ile
545

<210> 35
<211> 9
<212> DNA
<213> Influenza virus

<400> 35
gagagttgg 9

<210> 36
<211> 9
<212> DNA
<213> Influenza virus

<400> 36
ccgttggtc 9

<210> 37
<211> 9
<212> DNA
<213> Influenza virus

<400> 37
caaaccaga 9

<210> 38
<211> 9
<212> DNA
<213> Influenza virus

<400> 38
agaactggg 9

<210> 39
<211> 15
<212> DNA
<213> Influenza virus

<400> 39
tatgagagtt gggac 15

<210> 40
<211> 15
<212> DNA
<213> Influenza virus

<400> 40
agaccgttgg tcaga 15

<210> 41
<211> 15
<212> DNA
<213> Influenza virus

<400> 41
aagcaaacca gagga 15

<210> 42
<211> 15
<212> DNA
<213> Influenza virus

<400> 42
ataagaactg ggaca 15

<210> 43
<211> 9
<212> DNA
<213> Influenza virus

<400> 43
acaatgagt 9

<210> 44
<211> 15
<212> DNA
<213> Influenza virus

<400> 44
aaaacaatga gtgat 15

<210> 45
<211> 9
<212> DNA
<213> Influenza virus

<400> 45
gatgtaccc 9

<210> 46
<211> 15
<212> DNA
<213> Influenza virus

<400> 46

tcagatgtac ccata 15

<210> 47
<211> 2280
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2280)

<400> 47

```
atg gag aga ata aaa gaa ctg aga gat ctg atg tta caa tcc cgc acc      48
Met Glu Arg Ile Lys Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1               5                  10                  15

cgc gag ata cta aca aaa act act gtg gac cac atg gcc ata atc aag      96
Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
            20                  25                  30

aaa tac aca tca gga aga caa gag aag aac cct gca ctt agg atg aaa     144
Lys Tyr Thr Ser Gly Arg Gln Glu Lys Asn Pro Ala Leu Arg Met Lys
        35                  40                  45

tgg atg atg gca atg aaa tac cca att aca gca gat aag agg ata atg     192
Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
    50                  55                  60

gag atg att cct gag aga aat gaa cag gga caa acc ctt tgg agc aaa     240
Glu Met Ile Pro Glu Arg Asn Glu Gln Gly Gln Thr Leu Trp Ser Lys
65                  70                  75                  80

acg aac gat gct ggc tca gac cgc gta atg gta tca cct ctg gca gtg     288
Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
                85                  90                  95

aca tgg tgg aat agg aat gga cca aca acg aac aca att cat tat cca     336
Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Asn Thr Ile His Tyr Pro
            100                 105                 110

aaa gtc tac aaa act tat ttt gaa aag gtt gaa aga ttg aaa cac gga     384
Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
        115                 120                 125

acc ttt ggc ccc gtt cat ttt agg aat caa gtc aag ata aga cga aga     432
Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
    130                 135                 140

gtt gat gta aac cct ggt cac gcg gac ctc agt gct aaa gaa gca caa     480
Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145                 150                 155                 160

gat gtg atc atg gaa gtt gtt ttc cca aat gaa gtg gga gcc aga att     528
```

```
Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Arg Ile
                165                 170                 175

cta aca tca gaa tca caa cta aca ata acc aaa gag aaa aag gaa gaa      576
Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
            180                 185                 190

ctt cag gac tgc aaa att gct ccc ttg atg gta gca tac atg cta gaa      624
Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
        195                 200                 205

aga gag ttg gtc cga aaa aca agg ttc ctc cca gta gta ggc gga aca      672
Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Val Gly Gly Thr
    210                 215                 220

agc agt gta tac att gaa gtg ttg cat ctg act cag gga aca tgc tgg      720
Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225                 230                 235                 240

gag caa atg tac acc cca gga gga aaa gtt aga aac gat gat att gat      768
Glu Gln Met Tyr Thr Pro Gly Gly Lys Val Arg Asn Asp Asp Ile Asp
                245                 250                 255

caa agt tta att att gca gcc cgg aac ata gtg aga aga gca aca gta      816
Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
            260                 265                 270

tca gca gat cca cta gca tcc cta ctg gaa atg tgc cac agt aca cag      864
Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
        275                 280                 285

att ggt gga aca agg atg gta gac atc ctt aag cag aac cca aca gag      912
Ile Gly Gly Thr Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
    290                 295                 300

gaa caa gct gtg gat ata tgc aaa gca gca atg gga ttg aga att agc      960
Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305                 310                 315                 320

tca tca ttc agc ttt ggt gga ttc acc ttc aaa agg aca agt gga tca     1008
Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
                325                 330                 335

tca gtc aag aga gaa gaa gaa atg ctt acg ggc aac ctt caa aca ttg     1056
Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
            340                 345                 350

aaa ata aga gtg cat gag ggc tat gaa gaa ttc aca atg gtc gga aga     1104
Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
        355                 360                 365

aga gca aca gcc att atc aga aag gca acc aga aga ttg att caa ttg     1152
Arg Ala Thr Ala Ile Ile Arg Lys Ala Thr Arg Arg Leu Ile Gln Leu
    370                 375                 380
```

```
ata gta agt ggg aga gat gaa caa tca att gct gaa gca ata att gta      1200
Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385                 390                 395                 400

gcc atg gtg ttt tcg caa gaa gat tgc atg ata aaa gca gtt cga ggc      1248
Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
                405                 410                 415

gat ttg aac ttt gtt aat aga gca aat cag cgt ttg aac ccc atg cat      1296
Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
            420                 425                 430

caa ctc ttg agg cat ttc caa aaa gat gca aaa gtg ctt ttc caa aat      1344
Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe Gln Asn
        435                 440                 445

tgg gga att gaa ccc atc gac aat gta atg ggg atg att gga ata ttg      1392
Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
    450                 455                 460

cct gac atg acc cca agc acc gag atg tca ttg aga gga gtg aga gtc      1440
Pro Asp Met Thr Pro Ser Thr Glu Met Ser Leu Arg Gly Val Arg Val
465                 470                 475                 480

agc aaa atg gga gtg gat gag tac tcc agc act gag aga gtg gtg gtg      1488
Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
                485                 490                 495

agc att gac cgt ttt tta aga gtt cgg gat caa agg gga aac ata cta      1536
Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
            500                 505                 510

ctg tcc cct gaa gaa gtc agt gaa aca caa gga acg gaa aag ctg aca      1584
Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
        515                 520                 525

ata att tat tcg tca tca atg atg tgg gag att aat ggt ccc gaa tca      1632
Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
    530                 535                 540

gtg ttg gtc aat act tat caa tgg atc atc aga aac tgg gaa att gta      1680
Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545                 550                 555                 560

aaa att cag tgg tca cag gac ccc aca atg tta tac aat aag ata gaa      1728
Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
                565                 570                 575

ttt gaa cca ttc caa tcc ctg gtc cct agg gcc acc aga agc caa tac      1776
Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
            580                 585                 590

agc ggt ttc gta aga acc ctg ttt cag caa atg cga gat gta ctt gga      1824
Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
        595                 600                 605
```

```
aca ttt gat act gct caa ata ata aaa ctc ctc cct ttt gcc gct gct     1872
Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
    610                 615                 620

cct ccg gaa cag agt agg atg cag ttc tct tct ttg act gtt aat gta     1920
Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625                 630                 635                 640

aga ggt tcg gga atg agg ata ctt gta aga ggc aat tcc cca gtg ttc     1968
Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
                645                 650                 655

aac tac aat aaa gtc act aaa agg ctc aca gtc ctc gga aag gat gca     2016
Asn Tyr Asn Lys Val Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
            660                 665                 670

ggt gcg ctt act gag gac cca gat gaa ggt acg gct gga gta gag tct     2064
Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
        675                 680                 685

gct gtt cta aga ggg ttt ctc att tta ggt aaa gaa aac aag aga tat     2112
Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
    690                 695                 700

ggc cca gca cta agc atc aat gaa ctt agc aaa ctt gca aaa ggg gag     2160
Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705                 710                 715                 720

aaa gcc aat gta cta att ggg caa ggg gac gta gtg ttg gta atg aaa     2208
Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Val Val Leu Val Met Lys
                725                 730                 735

cgg aaa cgt gac tct agc ata ctt act gac agc cag aca gcg acc aaa     2256
Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
            740                 745                 750

agg att cgg atg gcc atc aat tag                                   2280
Arg Ile Arg Met Ala Ile Asn
        755
```

<210> 48
<211> 759
<212> PRT
<213> Influenza virus

<400> 48

```
Met Glu Arg Ile Lys Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1               5                   10                  15

Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
            20                  25                  30
```

```
Lys Tyr Thr Ser Gly Arg Gln Glu Lys Asn Pro Ala Leu Arg Met Lys
        35                  40                  45

Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
    50                  55                  60

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

Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
                85                  90                  95

Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Asn Thr Ile His Tyr Pro
            100                 105                 110

Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
        115                 120                 125

Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
    130                 135                 140

Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145                 150                 155                 160

Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Arg Ile
                165                 170                 175

Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
            180                 185                 190

Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
        195                 200                 205

Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Val Gly Gly Thr
    210                 215                 220

Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225                 230                 235                 240

Glu Gln Met Tyr Thr Pro Gly Gly Lys Val Arg Asn Asp Asp Ile Asp
```

245 250 255

Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
260 265 270

Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
275 280 285

Ile Gly Gly Thr Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
290 295 300

Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305 310 315 320

Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
325 330 335

Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
340 345 350

Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
355 360 365

Arg Ala Thr Ala Ile Ile Arg Lys Ala Thr Arg Arg Leu Ile Gln Leu
370 375 380

Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385 390 395 400

Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
405 410 415

Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
420 425 430

Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe Gln Asn
435 440 445

Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
450 455 460

```
Pro Asp Met Thr Pro Ser Thr Glu Met Ser Leu Arg Gly Val Arg Val
465                 470                 475                 480

Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
                485                 490                 495

Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
            500                 505                 510

Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
        515                 520                 525

Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
    530                 535                 540

Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545                 550                 555                 560

Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
                565                 570                 575

Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
            580                 585                 590

Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
        595                 600                 605

Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
    610                 615                 620

Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625                 630                 635                 640

Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
                645                 650                 655

Asn Tyr Asn Lys Val Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
            660                 665                 670

Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
        675                 680                 685
```

Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
690 695 700

Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705 710 715 720

Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Val Val Leu Val Met Lys
725 730 735

Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
740 745 750

Arg Ile Arg Met Ala Ile Asn
755

<210> 49
<211> 2274
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2274)

<400> 49
atg gat gtc aat ccg act cta ctt ttc tta aag gtg cca gcg caa aat 48
Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1 5 10 15

gct ata agc aca aca ttc cct tat act gga gat cct ccc tac agt cat 96
Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
20 25 30

gga aca ggg aca gga tac acc atg gat act gtc aac aga aca cac caa 144
Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
35 40 45

tat tca gaa aaa ggg aaa tgg aca aca aac act gag att gga gca cca 192
Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
50 55 60

caa ctt aat cca atc gat gga cca ctt cct gaa gac aat gaa cca agt 240
Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65 70 75 80

ggg tac gcc caa aca gat tgt gta ttg gaa gca atg gct ttc ctt gaa 288
Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
85 90 95

```
gaa tcc cat ccc gga atc ttt gaa aat tcg tgt ctt gaa acg atg gag      336
Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
            100                 105                 110

gtg att cag cag aca aga gtg gac aaa cta aca caa ggc cga caa act      384
Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
        115                 120                 125

tat gat tgg acc ttg aat agg aat caa cct gcc gca aca gca ctt gct      432
Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
    130                 135                 140

aat acg att gaa gta ttc aga tca aat ggt ctg acc tcc aat gaa tcg      480
Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145                 150                 155                 160

ggg aga ttg atg gac ttc ctc aaa gat gtc atg gag tcc atg aac aag      528
Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
                165                 170                 175

gag gaa atg gaa ata aca aca cac ttc caa cgg aag aga aga gta aga      576
Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
            180                 185                 190

gac aac atg aca aag aga atg ata aca cag aga acc ata gga aag aaa      624
Asp Asn Met Thr Lys Arg Met Ile Thr Gln Arg Thr Ile Gly Lys Lys
        195                 200                 205

aaa caa cga tta agc aga aag agc tat cta atc aga aca tta acc cta      672
Lys Gln Arg Leu Ser Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
    210                 215                 220

aac aca atg acc aag gac gct gag aga ggg aaa ttg aaa cga cga gca      720
Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225                 230                 235                 240

atc gct acc cca ggg atg cag ata aga gga ttt gta tat ttt gtt gaa      768
Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
                245                 250                 255

aca cta gct cga aga ata tgt gaa aag ctt gaa caa tca gga ttg cca      816
Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
            260                 265                 270

gtt ggc ggt aat gag aaa aag gcc aaa ctg gct aat gtc gtc aga aaa      864
Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
        275                 280                 285

atg atg act aat tcc caa gac act gaa ctc tcc ttc acc atc act ggg      912
Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
    290                 295                 300

gac aat acc aaa tgg aat gaa aat cag aac cca cgc ata ttc ctg gca      960
Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
```

```
305                 310                 315                 320

atg atc aca tac ata act aga gat cag cca gaa tgg ttc aga aat gtt     1008
Met Ile Thr Tyr Ile Thr Arg Asp Gln Pro Glu Trp Phe Arg Asn Val
                325                 330                 335

cta agc att gca ccg att atg ttc tca aat aaa atg gca aga ctg ggg     1056
Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
            340                 345                 350

aaa gga tat atg ttt gaa agc aaa agt atg aaa ttg aga act caa ata     1104
Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
        355                 360                 365

cca gca gaa atg cta gca agc att gac cta aaa tat ttc aat gat tca     1152
Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
    370                 375                 380

aca aaa aag aaa att gaa aag ata cga cca ctc ctg gtt gac ggg act     1200
Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385                 390                 395                 400

gct tca ctg agt cct ggc atg atg atg gga atg ttc aac atg ttg agc     1248
Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
                405                 410                 415

act gtg ctg ggt gta tcc ata tta aac ctg ggc cag agg aaa tat aca     1296
Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
            420                 425                 430

aag acc aca tac tgg tgg gat ggt ctg caa tca tcc gat gac ttt gct     1344
Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
        435                 440                 445

ttg ata gtg aat gcg cct aat cat gaa gga ata caa gct gga gta gac     1392
Leu Ile Val Asn Ala Pro Asn His Glu Gly Ile Gln Ala Gly Val Asp
    450                 455                 460

aga ttc tat aga act tgc aaa ctg gtc ggg atc aac atg agc aaa aag     1440
Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465                 470                 475                 480

aag tcc tac ata aat aga act gga aca ttc gaa ttc aca agc ttt ttc     1488
Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
                485                 490                 495

tac cgg tat ggt ttt gta gcc aat ttc agc atg gaa cta ccc agt ttt     1536
Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
            500                 505                 510

ggg gtt tcc gga ata aat gaa tct gca gac atg agc att gga gtg aca     1584
Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
        515                 520                 525

gtc atc aaa aac aac atg ata aat aat gat ctc ggt cct gcc acg gca     1632
```

```
Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
    530                 535                 540

caa atg gca ctc caa ctc ttc att aag gat tat cgg tac aca tac cgg     1680
Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545                 550                 555                 560

tgc cat aga ggt gat acc cag ata caa acc aga aga tct ttt gag ttg     1728
Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
                565                 570                 575

aag aaa ctg tgg gaa cag act cga tca aag act ggt cta ctg gta tca     1776
Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
            580                 585                 590

gat ggg ggt cca aac cta tat aac atc aga aac cta cac atc ccg gaa     1824
Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
        595                 600                 605

gtc tgt tta aaa tgg gag cta atg gat gaa gat tat aag ggg agg cta     1872
Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
    610                 615                 620

tgc aat cca ttg aat cct ttc gtt agt cac aaa gaa att gaa tca gtc     1920
Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625                 630                 635                 640

aac agt gca gta gta atg cct gct cat ggc cct gcc aaa agc atg gag     1968
Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
                645                 650                 655

tat gat gct gtt gca aca aca cat tct tgg atc ccc aag agg aac cgg     2016
Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
            660                 665                 670

tcc ata ttg aac aca agc caa agg gga ata cta gaa gat gag cag atg     2064
Ser Ile Leu Asn Thr Ser Gln Arg Gly Ile Leu Glu Asp Glu Gln Met
        675                 680                 685

tat cag aaa tgc tgc aac ctg ttt gaa aaa ttc ttc ccc agc agc tca     2112
Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
    690                 695                 700

tac aga aga cca gtc gga att tct agt atg gtt gag gcc atg gta tcc     2160
Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705                 710                 715                 720

agg gcc cgc att gat gca cga att gac ttc gaa tct gga cgg ata aag     2208
Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
                725                 730                 735

aag gat gag ttc gct gag atc atg aag atc tgt tcc acc att gaa gag     2256
Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
            740                 745                 750
```

ctc aga cgg caa aaa tag 2274
Leu Arg Arg Gln Lys
755

<210> 50
<211> 757
<212> PRT
<213> Influenza virus

<400> 50

Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1 5 10 15

Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
20 25 30

Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
35 40 45

Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
50 55 60

Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65 70 75 80

Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
85 90 95

Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
100 105 110

Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
115 120 125

Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
130 135 140

Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145 150 155 160

Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
165 170 175

```
Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
            180                 185                 190

Asp Asn Met Thr Lys Arg Met Ile Thr Gln Arg Thr Ile Gly Lys Lys
        195                 200                 205

Lys Gln Arg Leu Ser Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
    210                 215                 220

Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225                 230                 235                 240

Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
                245                 250                 255

Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
            260                 265                 270

Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
        275                 280                 285

Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
    290                 295                 300

Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305                 310                 315                 320

Met Ile Thr Tyr Ile Thr Arg Asp Gln Pro Glu Trp Phe Arg Asn Val
                325                 330                 335

Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
            340                 345                 350

Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
        355                 360                 365

Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
    370                 375                 380

Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385                 390                 395                 400
```

Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
405 410 415

Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
420 425 430

Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
435 440 445

Leu Ile Val Asn Ala Pro Asn His Glu Gly Ile Gln Ala Gly Val Asp
450 455 460

Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465 470 475 480

Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
485 490 495

Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
500 505 510

Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
515 520 525

Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
530 535 540

Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545 550 555 560

Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
565 570 575

Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
580 585 590

Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
595 600 605

Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu

610 615 620

Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625 630 635 640

Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
645 650 655

Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
660 665 670

Ser Ile Leu Asn Thr Ser Gln Arg Gly Ile Leu Glu Asp Glu Gln Met
675 680 685

Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
690 695 700

Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705 710 715 720

Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
725 730 735

Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
740 745 750

Leu Arg Arg Gln Lys
755

<210> 51
<211> 2151
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2151)

<400> 51
atg gaa gac ttt gtg cga cag tgc ttc aat cca atg atc gtc gag ctt 48
Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1 5 10 15

gcg gaa aag gca atg aaa gaa tat gga gag aac ccg aaa atc gaa aca 96

```
Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
            20                  25                  30

aac aaa ttt gca gca ata tgc act cac ttg gaa gtc tgc ttc atg tac      144
Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
        35                  40                  45

tcg gat ttc cac ttt ata aat gaa ctg ggt gag tca gtg gtc ata gag      192
Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
    50                  55                  60

tct ggt gac cca aat gct ctt ttg aaa cac aga ttt gaa atc att gag      240
Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65                  70                  75                  80

ggg aga gat cga aca atg gca tgg aca gta gta aac agc atc tgc aac      288
Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
                85                  90                  95

acc aca aga gct gaa aaa cct aaa ttt ctt cca gat tta tac gac tat      336
Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
            100                 105                 110

aaa gag aac aga ttt gtt gaa att ggt gtg aca agg aga gaa gtt cac      384
Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
        115                 120                 125

ata tac tac ctg gag aag gcc aac aaa ata aag tct gag aaa aca cat      432
Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
    130                 135                 140

atc cac att ttc tca ttt aca gga gaa gaa atg gct aca aaa gcg gac      480
Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145                 150                 155                 160

tat act ctt gat gaa gag agt aga gcc agg atc aag acc aga cta ttc      528
Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
                165                 170                 175

act ata aga caa gaa atg gcc agt aga ggc ctc tgg gat tcc ttt cgt      576
Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
            180                 185                 190

cag tcc gag aga ggc gaa gag aca att gaa gaa aga ttt gaa atc aca      624
Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
        195                 200                 205

ggg acg atg cgc aag ctt gcc aat tac agt ctc cca ccg aac ttc tcc      672
Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
    210                 215                 220

agc ctt gaa aat ttt aga gtc tat ata gat gga ttc gaa ccg aac ggc      720
Ser Leu Glu Asn Phe Arg Val Tyr Ile Asp Gly Phe Glu Pro Asn Gly
225                 230                 235                 240
```

```
tgc att gag agt aag ctt tct caa atg tcc aaa gaa gta aat gcc aaa      768
Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Lys
                245                 250                 255

ata gaa cca ttt tca aag aca aca ccc cga cca ctc aaa atg cca ggt      816
Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
            260                 265                 270

ggt cca ccc tgc cat cag cga tcc aaa ttc ttg cta atg gat gct ctg      864
Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
        275                 280                 285

aaa ctg agc att gag gac cca agt cac gag gga gag ggg ata cca cta      912
Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
    290                 295                 300

tat gat gca atc aaa tgc atg aaa act ttc ttt gga tgg aaa gag ccc      960
Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305                 310                 315                 320

agt att gtt aaa cca cat aaa aag ggt ata aac ccg aac tat ctc caa     1008
Ser Ile Val Lys Pro His Lys Lys Gly Ile Asn Pro Asn Tyr Leu Gln
                325                 330                 335

act tgg aag caa gta tta gaa gaa ata caa gac ctt gag aac gaa gaa     1056
Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
            340                 345                 350

agg acc ccc aag acc aag aat atg aaa aaa aca agc caa ttg aaa tgg     1104
Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
        355                 360                 365

gca cta ggt gaa aat atg gca cca gag aaa gtg gat ttt gag gat tgt     1152
Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

aaa gac atc aat gat tta aaa caa tat gac agt gat gag cca gaa gca     1200
Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Ala
385                 390                 395                 400

agg tct ctt gca agt tgg att caa agt gag ttc aac aag gct tgt gag     1248
Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

ctg aca gat tca agc tgg ata gag ctc gat gaa att ggg gag gat gtc     1296
Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

gcc cca ata gaa tac att gcg agc atg agg aga aat tat ttt act gct     1344
Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

gag att tcc cat tgt aga gca aca gaa tat ata atg aaa gga gtg tac     1392
Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Met Lys Gly Val Tyr
    450                 455                 460
```

```
atc aac act gct cta ctc aat gca tcc tgt gct gcg atg gat gaa ttt     1440
Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

caa tta att ccg atg ata agt aaa tgc agg acc aaa gaa ggg aga agg     1488
Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

aaa aca aat tta tat gga ttc ata ata aag gga agg tcc cat tta aga     1536
Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

aat gat act gac gtg gtg aac ttt gta agt atg gaa ttt tct ctc act     1584
Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525

gat cca aga ttt gag cca cac aaa tgg gaa aaa tac tgc gtt cta gaa     1632
Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
    530                 535                 540

att gga gac atg ctt tta aga act gct gta ggt caa gtg tca aga ccc     1680
Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545                 550                 555                 560

atg ttt ttg tat gta agg aca aat gga acc tct aaa att aaa atg aaa     1728
Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
                565                 570                 575

tgg gga atg gaa atg agg cgc tgc ctc ctt cag tct ctg caa cag att     1776
Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
            580                 585                 590

gaa agc atg atc gaa gct gag tcc tca gtc aaa gaa aag gac atg acc     1824
Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
        595                 600                 605

aaa gaa ttt ttt gag aac aaa tca gag aca tgg cct ata gga gag tcc     1872
Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
    610                 615                 620

ccc aaa gga gtg gaa gag ggc tca atc ggg aag gtt tgc agg acc tta     1920
Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625                 630                 635                 640

tta gca aaa tct gtg ttt aac agt tta tat gca tct cca caa ctg gaa     1968
Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
                645                 650                 655

gga ttt tca gct gaa tct agg aaa tta ctt ctc att gtt cag gct ctt     2016
Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
            660                 665                 670

aga gat gac ctg gaa cct gga acc ttt gat att ggg ggg tta tat gaa     2064
Arg Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
```

675 680 685

tca att gag gag tgc ctg att aat gat ccc tgg gtt ttg ctt aat gca 2112
Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
690 695 700

tct tgg ttc aac tcc ttc ctc aca cat gca ctg aag tag 2151
Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705 710 715

<210> 52
<211> 716
<212> PRT
<213> Influenza virus

<400> 52

Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1 5 10 15

Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
20 25 30

Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
35 40 45

Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
50 55 60

Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65 70 75 80

Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
85 90 95

Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
100 105 110

Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
115 120 125

Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
130 135 140

Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp

145 150 155 160

Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
165 170 175

Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
180 185 190

Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
195 200 205

Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
210 215 220

Ser Leu Glu Asn Phe Arg Val Tyr Ile Asp Gly Phe Glu Pro Asn Gly
225 230 235 240

Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Lys
245 250 255

Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
260 265 270

Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
275 280 285

Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
290 295 300

Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305 310 315 320

Ser Ile Val Lys Pro His Lys Lys Gly Ile Asn Pro Asn Tyr Leu Gln
325 330 335

Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
340 345 350

Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
355 360 365

```
Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Ala
385                 390                 395                 400

Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Met Lys Gly Val Tyr
    450                 455                 460

Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525

Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
    530                 535                 540

Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545                 550                 555                 560

Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
                565                 570                 575

Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
            580                 585                 590
```

```
Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
        595                 600                 605

Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
    610                 615                 620

Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625                 630                 635                 640

Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
                645                 650                 655

Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
            660                 665                 670

Arg Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
        675                 680                 685

Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
    690                 695                 700

Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705                 710                 715
```

<210> 53
<211> 844
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(690)

<400> 53

```
atg gat tcc aac act gtg tca agc ttt cag gta gac tgt ttt ctt tgg      48
Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1               5                   10                  15

cat gtc cgt aaa cga ttc gca gac caa gaa ctg ggt gat gcc cca ttc      96
His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
            20                  25                  30

ctt gac cgg ctt cgc cga gac cag aag tcc cta agg gga aga ggt agc     144
Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
        35                  40                  45
```

```
act ctt ggt ctg gac atc gaa aca gcc act cat gca gga aag cag ata      192
Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
    50                  55                  60

gtg gag cag att ctg gaa aag gaa tca gat gag gca ctt aaa atg acc      240
Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65                  70                  75                  80

att gcc tct gtt cct gct tca cgc tac tta act gac atg act ctt gat      288
Ile Ala Ser Val Pro Ala Ser Arg Tyr Leu Thr Asp Met Thr Leu Asp
                85                  90                  95

gag atg tca aga gac tgg ttc atg ctc atg ccc aag caa aaa gta aca      336
Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
            100                 105                 110

ggc tcc cta tgt ata aga atg gac cag gca atc atg gat aag aac atc      384
Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
        115                 120                 125

ata ctt aaa gca aac ttt agt gtg att ttc gaa agg ctg gaa aca cta      432
Ile Leu Lys Ala Asn Phe Ser Val Ile Phe Glu Arg Leu Glu Thr Leu
    130                 135                 140

ata cta ctt aga gcc ttc acc gaa gaa gga gca gtc gtt ggc gaa att      480
Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145                 150                 155                 160

tca cca tta cct tct ctt cca gga cat act aat gag gat gtc aaa aat      528
Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
                165                 170                 175

gca att ggg gtc ctc atc gga gga ctt aaa tgg aat gat aat acg gtt      576
Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
            180                 185                 190

aga atc tct gaa act cta cag aga ttc gct tgg aga agc agt cat gaa      624
Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
        195                 200                 205

aat ggg aga cct tca ttc cct tca aaa cag aaa cga aaa atg gag aga      672
Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys Arg Lys Met Glu Arg
    210                 215                 220

aca att aag cca gaa att tgaagaaata agatggttga ttgaagaagt            720
Thr Ile Lys Pro Glu Ile
225                 230

gcgacataga ttgaaaaata cagaaaatag ttttgaacaa ataacattta tgcaagcctt    780

acaactattg cttgaagtag aacaagagat aagaactttc tcgtttcagc ttatttaatg    840

ataa                                                                844
```

<210> 54
<211> 230
<212> PRT
<213> Influenza virus

<400> 54

Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1 5 10 15

His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
20 25 30

Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
35 40 45

Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
50 55 60

Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65 70 75 80

Ile Ala Ser Val Pro Ala Ser Arg Tyr Leu Thr Asp Met Thr Leu Asp
85 90 95

Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
100 105 110

Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
115 120 125

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

Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145 150 155 160

Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
165 170 175

Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
180 185 190

```
Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
        195                 200                 205

Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys Arg Lys Met Glu Arg
    210                 215                 220

Thr Ile Lys Pro Glu Ile
225                 230
```

<210> 55
<211> 1497
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1497)

<400> 55

```
atg gcg tct caa ggc acc aaa cga tcc tat gaa cag atg gaa act gat      48
Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1               5                   10                  15

ggg gaa cgc cag aat gca act gaa atc aga gca tct gtc gga agg atg      96
Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
            20                  25                  30

gtg gga gga atc gga cgg ttt tat gtc cag atg tgt act gag ctt aaa     144
Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
        35                  40                  45

cta aac gac cat gaa ggg cgg ctg att cag aac agc ata aca ata gaa     192
Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
    50                  55                  60

agg atg gtg ctt tcg gca ttc gac gaa aga aga aac aag tat ctc gag     240
Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65                  70                  75                  80

gag cat ccc agt gct ggg aaa gac cct aag aaa acg gga ggc ccg ata     288
Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
                85                  90                  95

tac aga aga aaa gat ggg aaa tgg atg agg gaa ctc atc ctc cat gat     336
Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
            100                 105                 110

aaa gaa gaa atc atg aga atc tgg cgt cag gcc aac aat ggt gaa gac     384
Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
        115                 120                 125
```

```
gct act gct ggt ctt act cat atg atg atc tgg cac tcc aat ctc aat      432
Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
    130                 135                 140

gac acc aca tac caa aga aca agg gct ctt gtt cgg act ggg atg gat      480
Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145                 150                 155                 160

ccc aga atg tgc tct ctg atg caa ggc tca acc ctc cca cgg aga tct      528
Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
                165                 170                 175

gga gcc gct ggt gct gca gta aaa ggc gtt gga aca atg gta atg gaa      576
Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
            180                 185                 190

ctc atc aga atg atc aag cgc gga ata aat gat cgg aat ttc tgg aga      624
Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
        195                 200                 205

ggt gaa aat ggt cga aga acc aga att gct tat gaa aga atg tgc aat      672
Gly Glu Asn Gly Arg Arg Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
    210                 215                 220

atc ctc aaa ggg aaa ttt cag aca gca gca caa cgg gct atg atg gac      720
Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225                 230                 235                 240

cag gtg agg gaa ggc cgc aat cct gga aac gct gag att gag gat ctc      768
Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
                245                 250                 255

att ttc ttg gca cga tca gca ctt att ttg aga gga tca gta gcc cat      816
Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
            260                 265                 270

aaa tca tgc cta cct gcc tgt gtt tat ggc ctt gca gta acc agt ggg      864
Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Val Thr Ser Gly
        275                 280                 285

tat gac ttt gag aag gaa gga tac tct ctg gtt gga att gat cct ttc      912
Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
    290                 295                 300

aaa cta ctc cag aac agt caa att ttc agt cta atc aga cca aaa gaa      960
Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305                 310                 315                 320

aac cca gca cac aaa agc cag ttg gtg tgg atg gca tgc cat tct gca     1008
Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
                325                 330                 335

gca ttt gag gat ctg aga gtt tta aat ttc att aga gga acc aaa gta     1056
Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
```

```
            340                 345                 350

atc cca aga gga cag tta aca acc aga gga gtt caa att gct tca aat     1104
Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
        355                 360                 365

gaa aac atg gag aca ata aat tct agc aca ctt gaa ctg aga agc aaa     1152
Glu Asn Met Glu Thr Ile Asn Ser Ser Thr Leu Glu Leu Arg Ser Lys
    370                 375                 380

tat tgg gca ata agg acc aga agc gga gga aac acc agt caa cag aga     1200
Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385                 390                 395                 400

gca tct gca gga cag ata agt gtg caa cct act ttc tca gta cag aga     1248
Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
                405                 410                 415

aat ctt ccc ttt gag aga gca acc att atg gct gca ttc act ggt aac     1296
Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
            420                 425                 430

act gaa gga agg act tcc gac atg aga acg gaa atc ata agg atg atg     1344
Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
        435                 440                 445

gaa aat gcc aaa tca gaa gat gtg tct ttc cag ggg cgg gga gtc ttc     1392
Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
    450                 455                 460

gag ctc tcg gac gaa aag gca acg aac ccg atc gtg cct tcc ttt gac     1440
Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465                 470                 475                 480

atg agc aat gaa ggg tct tat ttc ttc gga gac aat gct gag gag ttt     1488
Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
                485                 490                 495

gac agt taa                                                        1497
Asp Ser
```

<210> 56
<211> 498
<212> PRT
<213> Influenza virus

<400> 56

```
Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1               5                   10                  15

Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
```

20 25 30

Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
35 40 45

Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
50 55 60

Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65 70 75 80

Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
85 90 95

Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
100 105 110

Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
115 120 125

Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
130 135 140

Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145 150 155 160

Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
165 170 175

Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
180 185 190

Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
195 200 205

Gly Glu Asn Gly Arg Arg Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
210 215 220

Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225 230 235 240

Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
245 250 255

Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
260 265 270

Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Val Thr Ser Gly
275 280 285

Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
290 295 300

Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305 310 315 320

Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
325 330 335

Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
340 345 350

Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
355 360 365

Glu Asn Met Glu Thr Ile Asn Ser Ser Thr Leu Glu Leu Arg Ser Lys
370 375 380

Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385 390 395 400

Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
405 410 415

Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
420 425 430

Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
435 440 445

Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
450 455 460

```
Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465                 470                 475                 480

Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
                485                 490                 495

Asp Ser
```

<210> 57
<211> 1413
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1413)

<400> 57

```
atg aat cca aat caa aag ata ata gca att gga ttt gca tca ttg ggg        48
Met Asn Pro Asn Gln Lys Ile Ile Ala Ile Gly Phe Ala Ser Leu Gly
1               5                   10                  15

ata tta atc att aat gtc att ctc cat gta gtc agc att ata gta aca        96
Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
            20                  25                  30

gta ctg gtc ctc aat aac aat aga aca gat ctg aac tgc aaa ggg acg       144
Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
        35                  40                  45

atc ata aga gaa tac aat gaa aca gta aga gta gaa aaa ctt act caa       192
Ile Ile Arg Glu Tyr Asn Glu Thr Val Arg Val Glu Lys Leu Thr Gln
    50                  55                  60

tgg tat aat acc agt aca att aag tac ata gag aga cct tca aat gaa       240
Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65                  70                  75                  80

tac tac atg aat aac act gaa cca ctt tgt gag gcc caa ggc ttt gca       288
Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
                85                  90                  95

cca ttt tcc aaa gat aat gga ata cga att ggg tcg aga ggc cat gtt       336
Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
            100                 105                 110

ttt gtg ata aga gaa cct ttt gta tca tgt tcg ccc tca gaa tgt aga       384
Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
        115                 120                 125
```

```
acc ttt ttc ctc aca cag ggc tca tta ctc aat gac aaa cat tct aac      432
Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
    130                 135                 140

ggc aca ata aag gat cga agt ccg tat agg act ttg atg agt gtc aaa      480
Gly Thr Ile Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145                 150                 155                 160

ata ggg caa tca cct aat gta tat caa gct agg ttt gaa tcg gtg gca      528
Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
                165                 170                 175

tgg tca gca aca gca tgc cat gat gga aaa aaa tgg atg aca gtt gga      576
Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
            180                 185                 190

gtc aca ggg ccc gac aat caa gca att gca gta gtg aac tat gga ggt      624
Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
        195                 200                 205

gtt ccg gtt gat att att aat tca tgg gca ggg gat att tta aga acc      672
Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

caa gaa tca tca tgc acc tgc att aaa gga gac tgt tat tgg gta atg      720
Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240

act gat gga ccg gca aat agg caa gct aaa tat agg ata ttc aaa gca      768
Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255

aaa gat gga aga gta att gga caa act gat ata agt ttc aat ggg gga      816
Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

cac ata gag gag tgt tct tgt tac ccc aat gaa ggg aag gtg gaa tgc      864
His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
        275                 280                 285

ata tgc agg gac aat tgg act gga aca aat aga cca att ctg gta ata      912
Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Ile Leu Val Ile
    290                 295                 300

tct tct gat cta tcg tac aca gtt gga tat ttg tgt gct ggc att ccc      960
Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

act gac act cct agg gga gag gat agt caa ttc aca ggc tca tgt aca     1008
Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

agt cct ttg gga aat aaa gga tac ggt gta aaa ggc ttc ggg ttt cga     1056
Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
```

```
            340                 345                 350

caa gga act gac gta tgg gcc gga agg aca att agt agg act tca aga     1104
Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

tca gga ttc gaa ata ata aaa atc agg aat ggt tgg aca cag aac agt     1152
Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

aag gac caa atc agg agg caa gtg att atc gat gac cca aat tgg tca     1200
Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

gga tat agc ggt tct ttc aca ttg ccg gtt gaa ctg aca aaa aag gga     1248
Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
                405                 410                 415

tgt ttg gtc ccc tgt ttc tgg gtt gaa atg att aga ggt aaa cct gaa     1296
Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
            420                 425                 430

gaa aca aca ata tgg acc tct agc agc tcc att gtg atg tgt gga gta     1344
Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
        435                 440                 445

gat cat aaa att gcc agt tgg tca tgg cac gat gga gct att ctt ccc     1392
Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
    450                 455                 460

ttt gac atc gat aag atg taa                                        1413
Phe Asp Ile Asp Lys Met
465                 470
```

<210> 58
<211> 470
<212> PRT
<213> Influenza virus

<400> 58

```
Met Asn Pro Asn Gln Lys Ile Ile Ala Ile Gly Phe Ala Ser Leu Gly
1               5                   10                  15

Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
            20                  25                  30

Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
        35                  40                  45

Ile Ile Arg Glu Tyr Asn Glu Thr Val Arg Val Glu Lys Leu Thr Gln
```

50 55 60

Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65 70 75 80

Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
85 90 95

Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
100 105 110

Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
115 120 125

Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
130 135 140

Gly Thr Ile Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145 150 155 160

Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
165 170 175

Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
180 185 190

Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
195 200 205

Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
210 215 220

Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225 230 235 240

Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
245 250 255

Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
260 265 270

His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
275 280 285

Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Ile Leu Val Ile
290 295 300

Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305 310 315 320

Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
325 330 335

Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
340 345 350

Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
355 360 365

Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
370 375 380

Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385 390 395 400

Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
405 410 415

Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
420 425 430

Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
435 440 445

Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
450 455 460

Phe Asp Ile Asp Lys Met
465 470

<210> 59
<211> 981
<212> DNA

<213> Influenza virus

<220>
<221> CDS
<222> (1)..(756)

<400> 59

```
atg agt ctt cta acc gag gtc gaa acg tac gtt ctc tct atc gta cca       48
Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1               5                   10                  15

tca ggc ccc ctc aaa gcc gag atc gcg cag aga ctt gaa gat gtc ttt       96
Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
            20                  25                  30

gcg gga aag aac acc gat ctt gag gca ctc atg gaa tgg cta aag aca      144
Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
        35                  40                  45

aga cca atc ctg tca cct ctg act aaa ggg att tta gga ttt gta ttc      192
Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
    50                  55                  60

acg ctc acc gtg ccc agt gag cga gga ctg cag cgt aga cgc ttt gtc      240
Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65                  70                  75                  80

caa aat gcc ctt agt gga aac gga gat cca aac aac atg gac aga gca      288
Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
                85                  90                  95

gta aaa ctg tac agg aag ctt aaa aga gaa ata aca ttc cat ggg gca      336
Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
            100                 105                 110

aaa gag gtg gca ctc agc tat tcc act ggt gca cta gcc agc tgc atg      384
Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
        115                 120                 125

gga ctc ata tac aac aga atg gga act gtt aca acc gaa gtg gca ttt      432
Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
    130                 135                 140

ggc ctg gta tgc gcc aca tgt gaa cag att gct gat tcc cag cat cga      480
Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145                 150                 155                 160

tct cac agg cag atg gtg aca aca acc aac cca tta atc aga cat gaa      528
Ser His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
                165                 170                 175

aac aga atg gta tta gcc agt acc acg gct aaa gcc atg gaa cag atg      576
Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
            180                 185                 190
```

```
gca gga tcg agt gag cag gca gca gag gcc atg gag gtt gct agt agg      624
Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
        195                 200                 205

gct agg cag atg gta cag gca atg aga acc att ggg acc cac cct agc      672
Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
    210                 215                 220

tcc agt gcc ggt ttg aaa gat gat ctc ctt gaa aat tta cag gcc tac      720
Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225                 230                 235                 240

cag aaa cgg atg gga gtg caa atg cag cga ttc aag tgatcctctc           766
Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
                245                 250

gtcattgcag caagtatcat tgggatcttg cacttgatat tgtggattct tgatcgtctt    826

ttcttcaaat tcatttatcg tcgccttaaa tacgggttga aaagagggcc ttctacggaa    886

ggagtacctg agtctatgag ggaagaatat cggcaggaac agcagaatgc tgtggatgtt    946

gacgatggtc attttgtcaa catagagctg gagta                               981
```

<210> 60
<211> 252
<212> PRT
<213> Influenza virus

<400> 60

```
Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1               5                   10                  15

Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
            20                  25                  30

Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
        35                  40                  45

Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
    50                  55                  60

Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65                  70                  75                  80

Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
                85                  90                  95
```

```
Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
            100                 105                 110

Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
        115                 120                 125

Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
    130                 135                 140

Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145                 150                 155                 160

Ser His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
                165                 170                 175

Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
            180                 185                 190

Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
        195                 200                 205

Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
    210                 215                 220

Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225                 230                 235                 240

Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
                245                 250
```

<210> 61
<211> 1698
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1698)

<400> 61

```
atg aag aca acc att att tta ata cta ctg acc cat tgg gcc tac agt       48
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
```

```
1               5                   10                  15

caa aac cca atc agt ggc aat aac aca gcc aca ctg tgt ctg gga cac      96
Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30

cat gca gta gca aat gga aca ttg gta aaa aca atg agt gat gat caa     144
His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
        35                  40                  45

att gag gtg aca aat gct aca gaa tta gtt cag agc att tca atg ggg     192
Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
    50                  55                  60

aaa ata tgc aac aaa tca tat aga att cta gat gga aga aat tgc aca     240
Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65                  70                  75                  80

tta ata gat gca atg cta gga gac ccc cac tgt gac gcc ttt cag tat     288
Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
                85                  90                  95

gag agt tgg gac ctc ttt ata gaa aga agc agc gct ttc agc aat tgc     336
Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
            100                 105                 110

tac cca tat gac atc cct gac tat gca tcg ctc cga tcc att gta gca     384
Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
        115                 120                 125

tcc tca ggg aca gtg gaa ttc aca gca gag gga ttc aca tgg aca ggt     432
Ser Ser Gly Thr Val Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
    130                 135                 140

gta act caa aac gga aga agt gga gcc tgc aaa agg gga tca gcc gat     480
Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145                 150                 155                 160

agt ttc ttt agc cga ctg aat tgg cta aca aaa tct gga agc tct tac     528
Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
                165                 170                 175

ccc aca ttg aat gtg aca atg cct aac aat aaa aat ttc gac aag cta     576
Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
            180                 185                 190

tac atc tgg ggg att cat cac ccg agc tca aat caa gag cag aca aaa     624
Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
        195                 200                 205

ttg tac atc caa gaa tca gga cga gta aca gtc tca aca aaa aga agt     672
Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
    210                 215                 220

caa caa aca ata atc cct aac atc gga tct aga ccg ttg gtc aga ggt     720
```

```
Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225                 230                 235                 240

caa tca ggc agg ata agc ata tac tgg acc att gta aaa cct gga gat      768
Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
                245                 250                 255

atc cta atg ata aac agt aat ggc aac tta gtt gca ccg cgg gga tat      816
Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
            260                 265                 270

ttt aaa ttg aac aca ggg aaa agc tct gta atg aga tcc gat gta ccc      864
Phe Lys Leu Asn Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
        275                 280                 285

ata gac att tgt gtg tct gaa tgt att aca cca aat gga agc atc tcc      912
Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
    290                 295                 300

aac gac aag cca ttc caa aat gtg aac aaa gtt aca tat gga aaa tgc      960
Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305                 310                 315                 320

ccc aag tat atc agg caa aac act tta aag ctg gcc act ggg atg agg     1008
Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
                325                 330                 335

aat gta cca gaa aag caa acc aga gga atc ttt gga gca ata gcg gga     1056
Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
            340                 345                 350

ttc atc gaa aac ggc tgg gaa gga atg gtt gat ggg tgg tat ggg ttc     1104
Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
        355                 360                 365

cga tat caa aac tct gaa gga aca ggg caa gct gca gat cta aag agc     1152
Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
    370                 375                 380

act caa gca gcc atc gac cag att aat gga aag tta aac aga gtg att     1200
Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385                 390                 395                 400

gaa aga acc aat gag aaa ttc cat caa ata gag aag gaa ttc tca gaa     1248
Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
                405                 410                 415

gta gaa gga aga att cag gac ttg gag aaa tat gta gaa gac acc aaa     1296
Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
            420                 425                 430

ata gac cta tgg tcc tac aat gca gaa ttg ctg gtg gct cta gaa aat     1344
Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
        435                 440                 445
```

```
caa cat aca att gac tta aca gat gca gaa atg aat aaa tta ttt gag     1392
Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
    450                 455                 460

aag act aga cgc cag tta aga gaa aac gca gaa gac atg gga ggt gga     1440
Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465                 470                 475                 480

tgt ttc aag att tac cac aaa tgt gat aat gca tgc att gaa tca ata     1488
Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Glu Ser Ile
                485                 490                 495

aga act ggg aca tat gac cat tac ata tac aaa gat gaa gca tta aac     1536
Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Lys Asp Glu Ala Leu Asn
            500                 505                 510

aat cga ttt cag atc aaa ggt gta gag ttg aaa tca ggc tac aaa gat     1584
Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
        515                 520                 525

tgg ata ctg tgg att tca ttc gcc ata tca tgc ttc tta att tgc gtt     1632
Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
    530                 535                 540

gtt cta ttg ggt ttc att atg tgg gct tgc caa aaa ggc aac atc aga     1680
Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
545                 550                 555                 560

tgc aac att tgc att tga                                             1698
Cys Asn Ile Cys Ile
                565
```

<210> 62
<211> 565
<212> PRT
<213> Influenza virus

<400> 62

```
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1               5                   10                  15

Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30

His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
        35                  40                  45

Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
    50                  55                  60
```

```
Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65                  70                  75                  80

Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
                85                  90                  95

Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
            100                 105                 110

Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Ser Leu Arg Ser Ile Val Ala
        115                 120                 125

Ser Ser Gly Thr Val Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
    130                 135                 140

Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145                 150                 155                 160

Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
                165                 170                 175

Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
            180                 185                 190

Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
        195                 200                 205

Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
    210                 215                 220

Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225                 230                 235                 240

Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
                245                 250                 255

Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
            260                 265                 270

Phe Lys Leu Asn Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
        275                 280                 285
```

Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
290 295 300

Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305 310 315 320

Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
325 330 335

Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
340 345 350

Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
355 360 365

Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
370 375 380

Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385 390 395 400

Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
405 410 415

Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
420 425 430

Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
435 440 445

Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
450 455 460

Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465 470 475 480

Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Glu Ser Ile
485 490 495

Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Lys Asp Glu Ala Leu Asn

```
            500                 505                 510

Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
        515                 520                 525

Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
    530                 535                 540

Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
545                 550                 555                 560

Cys Asn Ile Cys Ile
                565
```

<210> 63
<211> 2280
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2280)

<400> 63

```
atg gag aga ata aaa gaa ctg aga gat ctg atg tta caa tcc cgc acc       48
Met Glu Arg Ile Lys Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1               5                   10                  15

cgc gag ata cta aca aaa act act gtg gac cac atg gcc ata atc aag       96
Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
            20                  25                  30

aaa tac aca tca gga aga caa gag aag aac cct gca ctt agg atg aaa      144
Lys Tyr Thr Ser Gly Arg Gln Glu Lys Asn Pro Ala Leu Arg Met Lys
        35                  40                  45

tgg atg atg gca atg aaa tac cca att aca gca gat aag agg ata atg      192
Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
    50                  55                  60

gag atg att cct gag aga aat gaa cag gga caa acc ctt tgg agc aaa      240
Glu Met Ile Pro Glu Arg Asn Glu Gln Gly Gln Thr Leu Trp Ser Lys
65                  70                  75                  80

acg aac gat gct ggc tca gac cgc gta atg gta tca cct ctg gca gtg      288
Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
                85                  90                  95

aca tgg tgg aat agg aat gga cca aca acg aac aca att cat tat cca      336
```

```
Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Asn Thr Ile His Tyr Pro
            100                 105                 110

aaa gtc tac aaa act tat ttt gaa aag gtt gaa aga ttg aaa cac gga      384
Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
        115                 120                 125

acc ttt ggc ccc gtt cat ttt agg aat caa gtc aag ata aga cga aga      432
Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
    130                 135                 140

gtt gat gta aac cct ggt cac gcg gac ctc agt gct aaa gaa gca caa      480
Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145                 150                 155                 160

gat gtg atc atg gaa gtt gtt ttc cca aat gaa gtg gga gcc aga att      528
Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Arg Ile
                165                 170                 175

cta aca tca gaa tca caa cta aca ata acc aaa gag aaa aag gaa gaa      576
Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu
            180                 185                 190

ctt cag gac tgc aaa att gct ccc ttg atg gta gca tac atg cta gaa      624
Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
        195                 200                 205

aga gag ttg gtc cga aaa aca agg ttc ctc cca gta gta ggc gga aca      672
Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Val Gly Gly Thr
    210                 215                 220

agc agt gta tac att gaa gtg ttg cat ctg act cag gga aca tgc tgg      720
Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225                 230                 235                 240

gag caa atg tac acc cca gga gga aaa gtt aga aac gat gat att gat      768
Glu Gln Met Tyr Thr Pro Gly Gly Lys Val Arg Asn Asp Asp Ile Asp
                245                 250                 255

caa agt tta att att gca gcc cgg aac ata gtg aga aga gca aca gta      816
Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
            260                 265                 270

tca gca gat cca cta gca tcc cta ctg gaa atg tgc cac agt aca cag      864
Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
        275                 280                 285

att ggt gga aca agg atg gta gac atc ctt aag cag aac cca aca gag      912
Ile Gly Gly Thr Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
    290                 295                 300

gaa caa gct gtg gat ata tgc aaa gca gca atg gga ttg aga att agc      960
Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305                 310                 315                 320
```

```
tca tca ttc agc ttt ggt gga ttc acc ttc aaa agg aca agt gga tca     1008
Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
                325                 330                 335

tca gtc aag aga gaa gaa gaa atg ctt acg ggc aac ctt caa aca ttg     1056
Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
            340                 345                 350

aaa ata aga gtg cat gag ggc tat gaa gaa ttc aca atg gtc gga aga     1104
Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
        355                 360                 365

aga gca aca gcc att atc aga aag gca acc aga aga ttg att caa ttg     1152
Arg Ala Thr Ala Ile Ile Arg Lys Ala Thr Arg Arg Leu Ile Gln Leu
    370                 375                 380

ata gta agt ggg aga gat gaa caa tca att gct gaa gca ata att gta     1200
Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385                 390                 395                 400

gcc atg gtg ttt tcg caa gaa gat tgc atg ata aaa gca gtt cga ggc     1248
Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
                405                 410                 415

gat ttg aac ttt gtt aat aga gca aat cag cgt ttg aac ccc atg cat     1296
Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
            420                 425                 430

caa ctc ttg agg cat ttc caa aaa gat gca aaa gtg ctt ttc caa aat     1344
Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe Gln Asn
        435                 440                 445

tgg gga att gaa ccc atc gac aat gta atg ggg atg att gga ata ttg     1392
Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
    450                 455                 460

cct gac atg acc cca agc acc gag atg tca ttg aga gga gtg aga gtc     1440
Pro Asp Met Thr Pro Ser Thr Glu Met Ser Leu Arg Gly Val Arg Val
465                 470                 475                 480

agc aaa atg gga gtg gat gag tac tcc agc act gag aga gtg gtg gtg     1488
Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
                485                 490                 495

agc att gac cgt ttt tta aga gtt cgg gat caa agg gga aac ata cta     1536
Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
            500                 505                 510

ctg tcc cct gaa gaa gtc agt gaa aca caa gga acg gaa aag ctg aca     1584
Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
        515                 520                 525

ata att tat tcg tca tca atg atg tgg gag att aat ggt ccc gaa tca     1632
Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
    530                 535                 540
```

```
gtg ttg gtc aat act tat caa tgg atc atc aga aac tgg gaa att gta     1680
Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545                 550                 555                 560

aaa att cag tgg tca cag gac ccc aca atg tta tac aat aag ata gaa     1728
Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
                565                 570                 575

ttt gaa cca ttc caa tcc ctg gtc cct agg gcc acc aga agc caa tac     1776
Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
            580                 585                 590

agc ggt ttc gta aga acc ctg ttt cag caa atg cga gat gta ctt gga     1824
Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
        595                 600                 605

aca ttt gat act gct caa ata ata aaa ctc ctc cct ttt gcc gct gct     1872
Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
    610                 615                 620

cct ccg gaa cag agt agg atg cag ttc tct tct ttg act gtt aat gta     1920
Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625                 630                 635                 640

aga ggt tcg gga atg agg ata ctt gta aga ggc aat tcc cca gtg ttc     1968
Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
                645                 650                 655

aac tac aat aaa gtc act aaa agg ctc aca gtc ctc gga aag gat gca     2016
Asn Tyr Asn Lys Val Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
            660                 665                 670

ggt gcg ctt act gag gac cca gat gaa ggt acg gct gga gta gag tct     2064
Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
        675                 680                 685

gct gtt cta aga ggg ttt ctc att tta ggt aaa gaa aac aag aga tat     2112
Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
    690                 695                 700

ggc cca gca cta agc atc aat gaa ctt agc aaa ctt gca aaa ggg gag     2160
Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705                 710                 715                 720

aaa gcc aat gta cta att ggg caa ggg gac gta gtg ttg gta atg aaa     2208
Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Val Val Leu Val Met Lys
                725                 730                 735

cgg aaa cgt gac tct agc ata ctt act gac agc cag aca gcg acc aaa     2256
Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
            740                 745                 750

agg att cgg atg gcc atc aat tag                                    2280
Arg Ile Arg Met Ala Ile Asn
```

755

<210> 64
<211> 759
<212> PRT
<213> Influenza virus

<400> 64

Met Glu Arg Ile Lys Glu Leu Arg Asp Leu Met Leu Gln Ser Arg Thr
1 5 10 15

Arg Glu Ile Leu Thr Lys Thr Thr Val Asp His Met Ala Ile Ile Lys
20 25 30

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

Trp Met Met Ala Met Lys Tyr Pro Ile Thr Ala Asp Lys Arg Ile Met
50 55 60

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

Thr Asn Asp Ala Gly Ser Asp Arg Val Met Val Ser Pro Leu Ala Val
85 90 95

Thr Trp Trp Asn Arg Asn Gly Pro Thr Thr Asn Thr Ile His Tyr Pro
100 105 110

Lys Val Tyr Lys Thr Tyr Phe Glu Lys Val Glu Arg Leu Lys His Gly
115 120 125

Thr Phe Gly Pro Val His Phe Arg Asn Gln Val Lys Ile Arg Arg Arg
130 135 140

Val Asp Val Asn Pro Gly His Ala Asp Leu Ser Ala Lys Glu Ala Gln
145 150 155 160

Asp Val Ile Met Glu Val Val Phe Pro Asn Glu Val Gly Ala Arg Ile
165 170 175

Leu Thr Ser Glu Ser Gln Leu Thr Ile Thr Lys Glu Lys Lys Glu Glu

180 185 190

Leu Gln Asp Cys Lys Ile Ala Pro Leu Met Val Ala Tyr Met Leu Glu
195 200 205

Arg Glu Leu Val Arg Lys Thr Arg Phe Leu Pro Val Val Gly Gly Thr
210 215 220

Ser Ser Val Tyr Ile Glu Val Leu His Leu Thr Gln Gly Thr Cys Trp
225 230 235 240

Glu Gln Met Tyr Thr Pro Gly Gly Lys Val Arg Asn Asp Asp Ile Asp
245 250 255

Gln Ser Leu Ile Ile Ala Ala Arg Asn Ile Val Arg Arg Ala Thr Val
260 265 270

Ser Ala Asp Pro Leu Ala Ser Leu Leu Glu Met Cys His Ser Thr Gln
275 280 285

Ile Gly Gly Thr Arg Met Val Asp Ile Leu Lys Gln Asn Pro Thr Glu
290 295 300

Glu Gln Ala Val Asp Ile Cys Lys Ala Ala Met Gly Leu Arg Ile Ser
305 310 315 320

Ser Ser Phe Ser Phe Gly Gly Phe Thr Phe Lys Arg Thr Ser Gly Ser
325 330 335

Ser Val Lys Arg Glu Glu Glu Met Leu Thr Gly Asn Leu Gln Thr Leu
340 345 350

Lys Ile Arg Val His Glu Gly Tyr Glu Glu Phe Thr Met Val Gly Arg
355 360 365

Arg Ala Thr Ala Ile Ile Arg Lys Ala Thr Arg Arg Leu Ile Gln Leu
370 375 380

Ile Val Ser Gly Arg Asp Glu Gln Ser Ile Ala Glu Ala Ile Ile Val
385 390 395 400

Ala Met Val Phe Ser Gln Glu Asp Cys Met Ile Lys Ala Val Arg Gly
405 410 415

Asp Leu Asn Phe Val Asn Arg Ala Asn Gln Arg Leu Asn Pro Met His
420 425 430

Gln Leu Leu Arg His Phe Gln Lys Asp Ala Lys Val Leu Phe Gln Asn
435 440 445

Trp Gly Ile Glu Pro Ile Asp Asn Val Met Gly Met Ile Gly Ile Leu
450 455 460

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

Ser Lys Met Gly Val Asp Glu Tyr Ser Ser Thr Glu Arg Val Val Val
485 490 495

Ser Ile Asp Arg Phe Leu Arg Val Arg Asp Gln Arg Gly Asn Ile Leu
500 505 510

Leu Ser Pro Glu Glu Val Ser Glu Thr Gln Gly Thr Glu Lys Leu Thr
515 520 525

Ile Ile Tyr Ser Ser Ser Met Met Trp Glu Ile Asn Gly Pro Glu Ser
530 535 540

Val Leu Val Asn Thr Tyr Gln Trp Ile Ile Arg Asn Trp Glu Ile Val
545 550 555 560

Lys Ile Gln Trp Ser Gln Asp Pro Thr Met Leu Tyr Asn Lys Ile Glu
565 570 575

Phe Glu Pro Phe Gln Ser Leu Val Pro Arg Ala Thr Arg Ser Gln Tyr
580 585 590

Ser Gly Phe Val Arg Thr Leu Phe Gln Gln Met Arg Asp Val Leu Gly
595 600 605

Thr Phe Asp Thr Ala Gln Ile Ile Lys Leu Leu Pro Phe Ala Ala Ala
610 615 620

Pro Pro Glu Gln Ser Arg Met Gln Phe Ser Ser Leu Thr Val Asn Val
625 630 635 640

Arg Gly Ser Gly Met Arg Ile Leu Val Arg Gly Asn Ser Pro Val Phe
645 650 655

Asn Tyr Asn Lys Val Thr Lys Arg Leu Thr Val Leu Gly Lys Asp Ala
660 665 670

Gly Ala Leu Thr Glu Asp Pro Asp Glu Gly Thr Ala Gly Val Glu Ser
675 680 685

Ala Val Leu Arg Gly Phe Leu Ile Leu Gly Lys Glu Asn Lys Arg Tyr
690 695 700

Gly Pro Ala Leu Ser Ile Asn Glu Leu Ser Lys Leu Ala Lys Gly Glu
705 710 715 720

Lys Ala Asn Val Leu Ile Gly Gln Gly Asp Val Val Leu Val Met Lys
725 730 735

Arg Lys Arg Asp Ser Ser Ile Leu Thr Asp Ser Gln Thr Ala Thr Lys
740 745 750

Arg Ile Arg Met Ala Ile Asn
755

<210> 65
<211> 2274
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2274)

<400> 65
atg gat gtc aat ccg act cta ctt ttc tta aag gtg cca gcg caa aat 48
Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1 5 10 15

gct ata agc aca aca ttc cct tat act gga gat cct ccc tac agt cat 96
Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
20 25 30

```
gga aca ggg aca gga tac acc atg gat act gtc aac aga aca cac caa      144
Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
        35                  40                  45

tat tca gaa aaa ggg aaa tgg aca aca aac act gag att gga gca cca      192
Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
    50                  55                  60

caa ctt aat cca atc gat gga cca ctt cct gaa gac aat gaa cca agt      240
Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65                  70                  75                  80

ggg tac gcc caa aca gat tgt gta ttg gaa gca atg gct ttc ctt gaa      288
Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
                85                  90                  95

gaa tcc cat ccc gga atc ttt gaa aat tcg tgt ctt gaa acg atg gag      336
Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
            100                 105                 110

gtg att cag cag aca aga gtg gac aaa cta aca caa ggc cga caa act      384
Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
        115                 120                 125

tat gat tgg acc ttg aat agg aat caa cct gcc gca aca gca ctt gct      432
Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
    130                 135                 140

aat acg att gaa gta ttc aga tca aat ggt ctg acc tcc aat gaa tcg      480
Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145                 150                 155                 160

ggg aga ttg atg gac ttc ctc aaa gat gtc atg gag tcc atg aac aag      528
Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
                165                 170                 175

gag gaa atg gaa ata aca aca cac ttc caa cgg aag aga aga gta aga      576
Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
            180                 185                 190

gac aac atg aca aag aga atg ata aca cag aga acc ata gga aag aaa      624
Asp Asn Met Thr Lys Arg Met Ile Thr Gln Arg Thr Ile Gly Lys Lys
        195                 200                 205

aaa caa cga tta agc aga aag agc tat cta atc aga aca tta acc cta      672
Lys Gln Arg Leu Ser Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
    210                 215                 220

aac aca atg acc aag gac gct gag aga ggg aaa ttg aaa cga cga gca      720
Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225                 230                 235                 240

atc gct acc cca ggg atg cag ata aga gga ttt gta tat ttt gtt gaa      768
Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
```

```
                245                 250                 255

aca cta gct cga aga ata tgt gaa aag ctt gaa caa tca gga ttg cca      816
Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
            260                 265                 270

gtt ggc ggt aat gag aaa aag gcc aaa ctg gct aat gtc gtc aga aaa      864
Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
        275                 280                 285

atg atg act aat tcc caa gac act gaa ctc tcc ttc acc atc act ggg      912
Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
    290                 295                 300

gac aat acc aaa tgg aat gaa aat cag aac cca cgc ata ttc ctg gca      960
Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305                 310                 315                 320

atg atc aca tac ata act aga gat cag cca gaa tgg ttc aga aat gtt     1008
Met Ile Thr Tyr Ile Thr Arg Asp Gln Pro Glu Trp Phe Arg Asn Val
                325                 330                 335

cta agc att gca ccg att atg ttc tca aat aaa atg gca aga ctg ggg     1056
Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
            340                 345                 350

aaa gga tat atg ttt gaa agc aaa agt atg aaa ttg aga act caa ata     1104
Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
        355                 360                 365

cca gca gaa atg cta gca agc att gac cta aaa tat ttc aat gat tca     1152
Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
    370                 375                 380

aca aaa aag aaa att gaa aag ata cga cca ctc ctg gtt gac ggg act     1200
Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385                 390                 395                 400

gct tca ctg agt cct ggc atg atg atg gga atg ttc aac atg ttg agc     1248
Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
                405                 410                 415

act gtg ctg ggt gta tcc ata tta aac ctg ggc cag agg aaa tat aca     1296
Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
            420                 425                 430

aag acc aca tac tgg tgg gat ggt ctg caa tca tcc gat gac ttt gct     1344
Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
        435                 440                 445

ttg ata gtg aat gcg cct aat cat gaa gga ata caa gct gga gta gac     1392
Leu Ile Val Asn Ala Pro Asn His Glu Gly Ile Gln Ala Gly Val Asp
    450                 455                 460

aga ttc tat aga act tgc aaa ctg gtc ggg atc aac atg agc aaa aag     1440
```

```
Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465                 470                 475                 480

aag tcc tac ata aat aga act gga aca ttc gaa ttc aca agc ttt ttc      1488
Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
                485                 490                 495

tac cgg tat ggt ttt gta gcc aat ttc agc atg gaa cta ccc agt ttt      1536
Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
            500                 505                 510

ggg gtt tcc gga ata aat gaa tct gca gac atg agc att gga gtg aca      1584
Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
        515                 520                 525

gtc atc aaa aac aac atg ata aat aat gat ctc ggt cct gcc acg gca      1632
Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
    530                 535                 540

caa atg gca ctc caa ctc ttc att aag gat tat cgg tac aca tac cgg      1680
Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg
545                 550                 555                 560

tgc cat aga ggt gat acc cag ata caa acc aga aga tct ttt gag ttg      1728
Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
                565                 570                 575

aag aaa ctg tgg gaa cag act cga tca aag act ggt cta ctg gta tca      1776
Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
            580                 585                 590

gat ggg ggt cca aac cta tat aac atc aga aac cta cac atc ccg gaa      1824
Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
        595                 600                 605

gtc tgt tta aaa tgg gag cta atg gat gaa gat tat aag ggg agg cta      1872
Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
    610                 615                 620

tgc aat cca ttg aat cct ttc gtt agt cac aaa gaa att gaa tca gtc      1920
Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625                 630                 635                 640

aac agt gca gta gta atg cct gct cat ggc cct gcc aaa agc atg gag      1968
Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
                645                 650                 655

tat gat gct gtt gca aca aca cat tct tgg atc ccc aag agg aac cgg      2016
Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
            660                 665                 670

tcc ata ttg aac aca agc caa agg gga ata cta gaa gat gag cag atg      2064
Ser Ile Leu Asn Thr Ser Gln Arg Gly Ile Leu Glu Asp Glu Gln Met
        675                 680                 685
```

```
tat cag aaa tgc tgc aac ctg ttt gaa aaa ttc ttc ccc agc agc tca      2112
Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
    690                 695                 700

tac aga aga cca gtc gga att tct agt atg gtt gag gcc atg gta tcc      2160
Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705                 710                 715                 720

agg gcc cgc att gat gca cga att gac ttc gaa tct gga cgg ata aag      2208
Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
                725                 730                 735

aag gat gag ttc gct gag atc atg aag atc tgt tcc acc att gaa gag      2256
Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
            740                 745                 750

ctc aga cgg caa aaa tag                                             2274
Leu Arg Arg Gln Lys
        755
```

<210> 66
<211> 757
<212> PRT
<213> Influenza virus

<400> 66

```
Met Asp Val Asn Pro Thr Leu Leu Phe Leu Lys Val Pro Ala Gln Asn
1               5                   10                  15

Ala Ile Ser Thr Thr Phe Pro Tyr Thr Gly Asp Pro Pro Tyr Ser His
            20                  25                  30

Gly Thr Gly Thr Gly Tyr Thr Met Asp Thr Val Asn Arg Thr His Gln
        35                  40                  45

Tyr Ser Glu Lys Gly Lys Trp Thr Thr Asn Thr Glu Ile Gly Ala Pro
    50                  55                  60

Gln Leu Asn Pro Ile Asp Gly Pro Leu Pro Glu Asp Asn Glu Pro Ser
65                  70                  75                  80

Gly Tyr Ala Gln Thr Asp Cys Val Leu Glu Ala Met Ala Phe Leu Glu
                85                  90                  95

Glu Ser His Pro Gly Ile Phe Glu Asn Ser Cys Leu Glu Thr Met Glu
            100                 105                 110
```

```
Val Ile Gln Gln Thr Arg Val Asp Lys Leu Thr Gln Gly Arg Gln Thr
        115                 120                 125

Tyr Asp Trp Thr Leu Asn Arg Asn Gln Pro Ala Ala Thr Ala Leu Ala
    130                 135                 140

Asn Thr Ile Glu Val Phe Arg Ser Asn Gly Leu Thr Ser Asn Glu Ser
145                 150                 155                 160

Gly Arg Leu Met Asp Phe Leu Lys Asp Val Met Glu Ser Met Asn Lys
                165                 170                 175

Glu Glu Met Glu Ile Thr Thr His Phe Gln Arg Lys Arg Arg Val Arg
            180                 185                 190

Asp Asn Met Thr Lys Arg Met Ile Thr Gln Arg Thr Ile Gly Lys Lys
        195                 200                 205

Lys Gln Arg Leu Ser Arg Lys Ser Tyr Leu Ile Arg Thr Leu Thr Leu
    210                 215                 220

Asn Thr Met Thr Lys Asp Ala Glu Arg Gly Lys Leu Lys Arg Arg Ala
225                 230                 235                 240

Ile Ala Thr Pro Gly Met Gln Ile Arg Gly Phe Val Tyr Phe Val Glu
                245                 250                 255

Thr Leu Ala Arg Arg Ile Cys Glu Lys Leu Glu Gln Ser Gly Leu Pro
            260                 265                 270

Val Gly Gly Asn Glu Lys Lys Ala Lys Leu Ala Asn Val Val Arg Lys
        275                 280                 285

Met Met Thr Asn Ser Gln Asp Thr Glu Leu Ser Phe Thr Ile Thr Gly
    290                 295                 300

Asp Asn Thr Lys Trp Asn Glu Asn Gln Asn Pro Arg Ile Phe Leu Ala
305                 310                 315                 320

Met Ile Thr Tyr Ile Thr Arg Asp Gln Pro Glu Trp Phe Arg Asn Val
                325                 330                 335
```

Leu Ser Ile Ala Pro Ile Met Phe Ser Asn Lys Met Ala Arg Leu Gly
340 345 350

Lys Gly Tyr Met Phe Glu Ser Lys Ser Met Lys Leu Arg Thr Gln Ile
355 360 365

Pro Ala Glu Met Leu Ala Ser Ile Asp Leu Lys Tyr Phe Asn Asp Ser
370 375 380

Thr Lys Lys Lys Ile Glu Lys Ile Arg Pro Leu Leu Val Asp Gly Thr
385 390 395 400

Ala Ser Leu Ser Pro Gly Met Met Met Gly Met Phe Asn Met Leu Ser
405 410 415

Thr Val Leu Gly Val Ser Ile Leu Asn Leu Gly Gln Arg Lys Tyr Thr
420 425 430

Lys Thr Thr Tyr Trp Trp Asp Gly Leu Gln Ser Ser Asp Asp Phe Ala
435 440 445

Leu Ile Val Asn Ala Pro Asn His Glu Gly Ile Gln Ala Gly Val Asp
450 455 460

Arg Phe Tyr Arg Thr Cys Lys Leu Val Gly Ile Asn Met Ser Lys Lys
465 470 475 480

Lys Ser Tyr Ile Asn Arg Thr Gly Thr Phe Glu Phe Thr Ser Phe Phe
485 490 495

Tyr Arg Tyr Gly Phe Val Ala Asn Phe Ser Met Glu Leu Pro Ser Phe
500 505 510

Gly Val Ser Gly Ile Asn Glu Ser Ala Asp Met Ser Ile Gly Val Thr
515 520 525

Val Ile Lys Asn Asn Met Ile Asn Asn Asp Leu Gly Pro Ala Thr Ala
530 535 540

Gln Met Ala Leu Gln Leu Phe Ile Lys Asp Tyr Arg Tyr Thr Tyr Arg

545 550 555 560

Cys His Arg Gly Asp Thr Gln Ile Gln Thr Arg Arg Ser Phe Glu Leu
565 570 575

Lys Lys Leu Trp Glu Gln Thr Arg Ser Lys Thr Gly Leu Leu Val Ser
580 585 590

Asp Gly Gly Pro Asn Leu Tyr Asn Ile Arg Asn Leu His Ile Pro Glu
595 600 605

Val Cys Leu Lys Trp Glu Leu Met Asp Glu Asp Tyr Lys Gly Arg Leu
610 615 620

Cys Asn Pro Leu Asn Pro Phe Val Ser His Lys Glu Ile Glu Ser Val
625 630 635 640

Asn Ser Ala Val Val Met Pro Ala His Gly Pro Ala Lys Ser Met Glu
645 650 655

Tyr Asp Ala Val Ala Thr Thr His Ser Trp Ile Pro Lys Arg Asn Arg
660 665 670

Ser Ile Leu Asn Thr Ser Gln Arg Gly Ile Leu Glu Asp Glu Gln Met
675 680 685

Tyr Gln Lys Cys Cys Asn Leu Phe Glu Lys Phe Phe Pro Ser Ser Ser
690 695 700

Tyr Arg Arg Pro Val Gly Ile Ser Ser Met Val Glu Ala Met Val Ser
705 710 715 720

Arg Ala Arg Ile Asp Ala Arg Ile Asp Phe Glu Ser Gly Arg Ile Lys
725 730 735

Lys Asp Glu Phe Ala Glu Ile Met Lys Ile Cys Ser Thr Ile Glu Glu
740 745 750

Leu Arg Arg Gln Lys
755

<210> 67
<211> 2151
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(2151)

<400> 67

```
atg gaa gac ttt gtg cga cag tgc ttc aat cca atg atc gtc gag ctt       48
Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1               5                  10                  15

gcg gaa aag gca atg aaa gaa tat gga gag aac ccg aaa atc gaa aca       96
Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
            20                  25                  30

aac aaa ttt gca gca ata tgc act cac ttg gaa gtc tgc ttc atg tac      144
Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
        35                  40                  45

tcg gat ttc cac ttt ata aat gaa ctg ggt gag tca gtg gtc ata gag      192
Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
    50                  55                  60

tct ggt gac cca aat gct ctt ttg aaa cac aga ttt gaa atc att gag      240
Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65                  70                  75                  80

ggg aga gat cga aca atg gca tgg aca gta gta aac agc atc tgc aac      288
Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn
                85                  90                  95

acc aca aga gct gaa aaa cct aaa ttt ctt cca gat tta tac gac tat      336
Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
            100                 105                 110

aaa gag aac aga ttt gtt gaa att ggt gtg aca agg aga gaa gtt cac      384
Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
        115                 120                 125

ata tac tac ctg gag aag gcc aac aaa ata aag tct gag aaa aca cat      432
Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
    130                 135                 140

atc cac att ttc tca ttt aca gga gaa gaa atg gct aca aaa gcg gac      480
Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145                 150                 155                 160

tat act ctt gat gaa gag agt aga gcc agg atc aag acc aga cta ttc      528
Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
                165                 170                 175
```

```
act ata aga caa gaa atg gcc agt aga ggc ctc tgg gat tcc ttt cgt      576
Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
            180                 185                 190

cag tcc gag aga ggc gaa gag aca att gaa gaa aga ttt gaa atc aca      624
Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
        195                 200                 205

ggg acg atg cgc aag ctt gcc aat tac agt ctc cca ccg aac ttc tcc      672
Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
    210                 215                 220

agc ctt gaa aat ttt aga gtc tat ata gat gga ttc gaa ccg aac ggc      720
Ser Leu Glu Asn Phe Arg Val Tyr Ile Asp Gly Phe Glu Pro Asn Gly
225                 230                 235                 240

tgc att gag agt aag ctt tct caa atg tcc aaa gaa gta aat gcc aaa      768
Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Lys
                245                 250                 255

ata gaa cca ttt tca aag aca aca ccc cga cca ctc aaa atg cca ggt      816
Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
            260                 265                 270

ggt cca ccc tgc cat cag cga tcc aaa ttc ttg cta atg gat gct ctg      864
Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
        275                 280                 285

aaa ctg agc att gag gac cca agt cac gag gga gag ggg ata cca cta      912
Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
    290                 295                 300

tat gat gca atc aaa tgc atg aaa act ttc ttt gga tgg aaa gag ccc      960
Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305                 310                 315                 320

agt att gtt aaa cca cat aaa aag ggt ata aac ccg aac tat ctc caa     1008
Ser Ile Val Lys Pro His Lys Lys Gly Ile Asn Pro Asn Tyr Leu Gln
                325                 330                 335

act tgg aag caa gta tta gaa gaa ata caa gac ctt gag aac gaa gaa     1056
Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
            340                 345                 350

agg acc ccc aag acc aag aat atg aaa aaa aca agc caa ttg aaa tgg     1104
Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
        355                 360                 365

gca cta ggt gaa aat atg gca cca gag aaa gtg gat ttt gag gat tgt     1152
Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

aaa gac atc aat gat tta aaa caa tat gac agt gat gag cca gaa gca     1200
Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Ala
385                 390                 395                 400
```

```
agg tct ctt gca agt tgg att caa agt gag ttc aac aag gct tgt gag      1248
Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

ctg aca gat tca agc tgg ata gag ctc gat gaa att ggg gag gat gtc      1296
Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

gcc cca ata gaa tac att gcg agc atg agg aga aat tat ttt act gct      1344
Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

gag att tcc cat tgt aga gca aca gaa tat ata atg aaa gga gtg tac      1392
Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Met Lys Gly Val Tyr
    450                 455                 460

atc aac act gct cta ctc aat gca tcc tgt gct gcg atg gat gaa ttt      1440
Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

caa tta att ccg atg ata agt aaa tgc agg acc aaa gaa ggg aga agg      1488
Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

aaa aca aat tta tat gga ttc ata ata aag gga agg tcc cat tta aga      1536
Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

aat gat act gac gtg gtg aac ttt gta agt atg gaa ttt tct ctc act      1584
Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525

gat cca aga ttt gag cca cac aaa tgg gaa aaa tac tgc gtt cta gaa      1632
Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
    530                 535                 540

att gga gac atg ctt tta aga act gct gta ggt caa gtg tca aga ccc      1680
Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545                 550                 555                 560

atg ttt ttg tat gta agg aca aat gga acc tct aaa att aaa atg aaa      1728
Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
                565                 570                 575

tgg gga atg gaa atg agg cgc tgc ctc ctt cag tct ctg caa cag att      1776
Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
            580                 585                 590

gaa agc atg atc gaa gct gag tcc tca gtc aaa gaa aag gac atg acc      1824
Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
        595                 600                 605

aaa gaa ttt ttt gag aac aaa tca gag aca tgg cct ata gga gag tcc      1872
Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
```

610 615 620

ccc aaa gga gtg gaa gag ggc tca atc ggg aag gtt tgc agg acc tta 1920
Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625 630 635 640

tta gca aaa tct gtg ttt aac agt tta tat gca tct cca caa ctg gaa 1968
Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
645 650 655

gga ttt tca gct gaa tct agg aaa tta ctt ctc att gtt cag gct ctt 2016
Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
660 665 670

aga gat gac ctg gaa cct gga acc ttt gat att ggg ggg tta tat gaa 2064
Arg Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
675 680 685

tca att gag gag tgc ctg att aat gat ccc tgg gtt ttg ctt aat gca 2112
Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
690 695 700

tct tgg ttc aac tcc ttc ctc aca cat gca ctg aag tag 2151
Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705 710 715

<210> 68
<211> 716
<212> PRT
<213> Influenza virus

<400> 68

Met Glu Asp Phe Val Arg Gln Cys Phe Asn Pro Met Ile Val Glu Leu
1 5 10 15

Ala Glu Lys Ala Met Lys Glu Tyr Gly Glu Asn Pro Lys Ile Glu Thr
20 25 30

Asn Lys Phe Ala Ala Ile Cys Thr His Leu Glu Val Cys Phe Met Tyr
35 40 45

Ser Asp Phe His Phe Ile Asn Glu Leu Gly Glu Ser Val Val Ile Glu
50 55 60

Ser Gly Asp Pro Asn Ala Leu Leu Lys His Arg Phe Glu Ile Ile Glu
65 70 75 80

Gly Arg Asp Arg Thr Met Ala Trp Thr Val Val Asn Ser Ile Cys Asn

85 90 95

Thr Thr Arg Ala Glu Lys Pro Lys Phe Leu Pro Asp Leu Tyr Asp Tyr
100 105 110

Lys Glu Asn Arg Phe Val Glu Ile Gly Val Thr Arg Arg Glu Val His
115 120 125

Ile Tyr Tyr Leu Glu Lys Ala Asn Lys Ile Lys Ser Glu Lys Thr His
130 135 140

Ile His Ile Phe Ser Phe Thr Gly Glu Glu Met Ala Thr Lys Ala Asp
145 150 155 160

Tyr Thr Leu Asp Glu Glu Ser Arg Ala Arg Ile Lys Thr Arg Leu Phe
165 170 175

Thr Ile Arg Gln Glu Met Ala Ser Arg Gly Leu Trp Asp Ser Phe Arg
180 185 190

Gln Ser Glu Arg Gly Glu Glu Thr Ile Glu Glu Arg Phe Glu Ile Thr
195 200 205

Gly Thr Met Arg Lys Leu Ala Asn Tyr Ser Leu Pro Pro Asn Phe Ser
210 215 220

Ser Leu Glu Asn Phe Arg Val Tyr Ile Asp Gly Phe Glu Pro Asn Gly
225 230 235 240

Cys Ile Glu Ser Lys Leu Ser Gln Met Ser Lys Glu Val Asn Ala Lys
245 250 255

Ile Glu Pro Phe Ser Lys Thr Thr Pro Arg Pro Leu Lys Met Pro Gly
260 265 270

Gly Pro Pro Cys His Gln Arg Ser Lys Phe Leu Leu Met Asp Ala Leu
275 280 285

Lys Leu Ser Ile Glu Asp Pro Ser His Glu Gly Glu Gly Ile Pro Leu
290 295 300

```
Tyr Asp Ala Ile Lys Cys Met Lys Thr Phe Phe Gly Trp Lys Glu Pro
305                 310                 315                 320

Ser Ile Val Lys Pro His Lys Lys Gly Ile Asn Pro Asn Tyr Leu Gln
                325                 330                 335

Thr Trp Lys Gln Val Leu Glu Glu Ile Gln Asp Leu Glu Asn Glu Glu
            340                 345                 350

Arg Thr Pro Lys Thr Lys Asn Met Lys Lys Thr Ser Gln Leu Lys Trp
        355                 360                 365

Ala Leu Gly Glu Asn Met Ala Pro Glu Lys Val Asp Phe Glu Asp Cys
    370                 375                 380

Lys Asp Ile Asn Asp Leu Lys Gln Tyr Asp Ser Asp Glu Pro Glu Ala
385                 390                 395                 400

Arg Ser Leu Ala Ser Trp Ile Gln Ser Glu Phe Asn Lys Ala Cys Glu
                405                 410                 415

Leu Thr Asp Ser Ser Trp Ile Glu Leu Asp Glu Ile Gly Glu Asp Val
            420                 425                 430

Ala Pro Ile Glu Tyr Ile Ala Ser Met Arg Arg Asn Tyr Phe Thr Ala
        435                 440                 445

Glu Ile Ser His Cys Arg Ala Thr Glu Tyr Ile Met Lys Gly Val Tyr
    450                 455                 460

Ile Asn Thr Ala Leu Leu Asn Ala Ser Cys Ala Ala Met Asp Glu Phe
465                 470                 475                 480

Gln Leu Ile Pro Met Ile Ser Lys Cys Arg Thr Lys Glu Gly Arg Arg
                485                 490                 495

Lys Thr Asn Leu Tyr Gly Phe Ile Ile Lys Gly Arg Ser His Leu Arg
            500                 505                 510

Asn Asp Thr Asp Val Val Asn Phe Val Ser Met Glu Phe Ser Leu Thr
        515                 520                 525
```

```
Asp Pro Arg Phe Glu Pro His Lys Trp Glu Lys Tyr Cys Val Leu Glu
    530                 535                 540

Ile Gly Asp Met Leu Leu Arg Thr Ala Val Gly Gln Val Ser Arg Pro
545                 550                 555                 560

Met Phe Leu Tyr Val Arg Thr Asn Gly Thr Ser Lys Ile Lys Met Lys
                565                 570                 575

Trp Gly Met Glu Met Arg Arg Cys Leu Leu Gln Ser Leu Gln Gln Ile
            580                 585                 590

Glu Ser Met Ile Glu Ala Glu Ser Ser Val Lys Glu Lys Asp Met Thr
        595                 600                 605

Lys Glu Phe Phe Glu Asn Lys Ser Glu Thr Trp Pro Ile Gly Glu Ser
    610                 615                 620

Pro Lys Gly Val Glu Glu Gly Ser Ile Gly Lys Val Cys Arg Thr Leu
625                 630                 635                 640

Leu Ala Lys Ser Val Phe Asn Ser Leu Tyr Ala Ser Pro Gln Leu Glu
                645                 650                 655

Gly Phe Ser Ala Glu Ser Arg Lys Leu Leu Leu Ile Val Gln Ala Leu
            660                 665                 670

Arg Asp Asp Leu Glu Pro Gly Thr Phe Asp Ile Gly Gly Leu Tyr Glu
        675                 680                 685

Ser Ile Glu Glu Cys Leu Ile Asn Asp Pro Trp Val Leu Leu Asn Ala
    690                 695                 700

Ser Trp Phe Asn Ser Phe Leu Thr His Ala Leu Lys
705                 710                 715
```

<210> 69
<211> 844
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(690)

<400> 69

```
atg gat tcc aac act gtg tca agc ttt cag gta gac tgt ttt ctt tgg       48
Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1               5                   10                  15

cat gtc cgt aaa cga ttc gca gac caa gaa ctg ggt gat gcc cca ttc       96
His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
            20                  25                  30

ctt gac cgg ctt cgc cga gac cag aag tcc cta agg gga aga ggt agc      144
Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
        35                  40                  45

act ctt ggt ctg gac atc gaa aca gcc act cat gca gga aag cag ata      192
Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
    50                  55                  60

gtg gag cag att ctg gaa aag gaa tca gat gag gca ctt aaa atg acc      240
Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65                  70                  75                  80

att gcc tct gtt cct gct tca cgc tac tta act gac atg act ctt gat      288
Ile Ala Ser Val Pro Ala Ser Arg Tyr Leu Thr Asp Met Thr Leu Asp
                85                  90                  95

gag atg tca aga gac tgg ttc atg ctc atg ccc aag caa aaa gta aca      336
Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
            100                 105                 110

ggc tcc cta tgt ata aga atg gac cag gca atc atg gat aag aac atc      384
Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
        115                 120                 125

ata ctt aaa gca aac ttt agt gtg att ttc gaa agg ctg gaa aca cta      432
Ile Leu Lys Ala Asn Phe Ser Val Ile Phe Glu Arg Leu Glu Thr Leu
    130                 135                 140

ata cta ctt aga gcc ttc acc gaa gaa gga gca gtc gtt ggc gaa att      480
Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145                 150                 155                 160

tca cca tta cct tct ctt cca gga cat act aat gag gat gtc aaa aat      528
Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
                165                 170                 175

gca att ggg gtc ctc atc gga gga ctt aaa tgg aat gat aat acg gtt      576
Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
            180                 185                 190

aga atc tct gaa act cta cag aga ttc gct tgg aga agc agt cat gaa      624
Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
```

195 200 205

aat ggg aga cct tca ttc cct tca aaa cag aaa cga aaa atg gag aga 672
Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys Arg Lys Met Glu Arg
210 215 220

aca att aag cca gaa att tgaagaaata agatggttga ttgaagaagt 720
Thr Ile Lys Pro Glu Ile
225 230

gcgacataga ttgaaaaata cagaaaatag ttttgaacaa ataacattta tgcaagcctt 780

acaactattg cttgaagtag aacaagagat aagaactttc tcgtttcagc ttatttaatg 840

ataa 844

<210> 70
<211> 230
<212> PRT
<213> Influenza virus

<400> 70

Met Asp Ser Asn Thr Val Ser Ser Phe Gln Val Asp Cys Phe Leu Trp
1 5 10 15

His Val Arg Lys Arg Phe Ala Asp Gln Glu Leu Gly Asp Ala Pro Phe
20 25 30

Leu Asp Arg Leu Arg Arg Asp Gln Lys Ser Leu Arg Gly Arg Gly Ser
35 40 45

Thr Leu Gly Leu Asp Ile Glu Thr Ala Thr His Ala Gly Lys Gln Ile
50 55 60

Val Glu Gln Ile Leu Glu Lys Glu Ser Asp Glu Ala Leu Lys Met Thr
65 70 75 80

Ile Ala Ser Val Pro Ala Ser Arg Tyr Leu Thr Asp Met Thr Leu Asp
85 90 95

Glu Met Ser Arg Asp Trp Phe Met Leu Met Pro Lys Gln Lys Val Thr
100 105 110

Gly Ser Leu Cys Ile Arg Met Asp Gln Ala Ile Met Asp Lys Asn Ile
115 120 125

```
Ile Leu Lys Ala Asn Phe Ser Val Ile Phe Glu Arg Leu Glu Thr Leu
    130                 135                 140

Ile Leu Leu Arg Ala Phe Thr Glu Glu Gly Ala Val Val Gly Glu Ile
145                 150                 155                 160

Ser Pro Leu Pro Ser Leu Pro Gly His Thr Asn Glu Asp Val Lys Asn
                165                 170                 175

Ala Ile Gly Val Leu Ile Gly Gly Leu Lys Trp Asn Asp Asn Thr Val
            180                 185                 190

Arg Ile Ser Glu Thr Leu Gln Arg Phe Ala Trp Arg Ser Ser His Glu
        195                 200                 205

Asn Gly Arg Pro Ser Phe Pro Ser Lys Gln Lys Arg Lys Met Glu Arg
    210                 215                 220

Thr Ile Lys Pro Glu Ile
225                 230
```

<210> 71
<211> 1497
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1497)

<400> 71

```
atg gcg tct caa ggc acc aaa cga tcc tat gaa cag atg gaa act gat       48
Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1               5                   10                  15

ggg gaa cgc cag aat gca act gaa atc aga gca tct gtc gga agg atg       96
Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
            20                  25                  30

gtg gga gga atc gga cgg ttt tat gtc cag atg tgt act gag ctt aaa      144
Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
        35                  40                  45

cta aac gac cat gaa ggg cgg ctg att cag aac agc ata aca ata gaa      192
Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
    50                  55                  60
```

```
agg atg gtg ctt tcg gca ttc gac gaa aga aga aac aag tat ctc gag      240
Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65                  70                  75                  80

gag cat ccc agt gct ggg aaa gac cct aag aaa acg gga ggc ccg ata      288
Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
                85                  90                  95

tac aga aga aaa gat ggg aaa tgg atg agg gaa ctc atc ctc cat gat      336
Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
            100                 105                 110

aaa gaa gaa atc atg aga atc tgg cgt cag gcc aac aat ggt gaa gac      384
Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
        115                 120                 125

gct act gct ggt ctt act cat atg atg atc tgg cac tcc aat ctc aat      432
Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
    130                 135                 140

gac acc aca tac caa aga aca agg gct ctt gtt cgg act ggg atg gat      480
Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145                 150                 155                 160

ccc aga atg tgc tct ctg atg caa ggc tca acc ctc cca cgg aga tct      528
Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
                165                 170                 175

gga gcc gct ggt gct gca gta aaa ggc gtt gga aca atg gta atg gaa      576
Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
            180                 185                 190

ctc atc aga atg atc aag cgc gga ata aat gat cgg aat ttc tgg aga      624
Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
        195                 200                 205

ggt gaa aat ggt cga aga acc aga att gct tat gaa aga atg tgc aat      672
Gly Glu Asn Gly Arg Arg Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
    210                 215                 220

atc ctc aaa ggg aaa ttt cag aca gca gca caa cgg gct atg atg gac      720
Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225                 230                 235                 240

cag gtg agg gaa ggc cgc aat cct gga aac gct gag att gag gat ctc      768
Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
                245                 250                 255

att ttc ttg gca cga tca gca ctt att ttg aga gga tca gta gcc cat      816
Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
            260                 265                 270

aaa tca tgc cta cct gcc tgt gtt tat ggc ctt gca cta acc agt ggg      864
Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Leu Thr Ser Gly
```

```
        275                 280                 285

tat gac ttt gag aag gaa gga tac tct ctg gtt gga att gat cct ttc      912
Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
    290                 295                 300

aaa cta ctc cag aac agt caa att ttc agt cta atc aga cca aaa gaa      960
Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305                 310                 315                 320

aac cca gca cac aaa agc cag ttg gtg tgg atg gca tgc cat tct gca     1008
Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
                325                 330                 335

gca ttt gag gat ctg aga gtt tta aat ttc att aga gga acc aaa gta     1056
Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
            340                 345                 350

atc cca aga gga cag tta aca acc aga gga gtt caa att gct tca aat     1104
Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
        355                 360                 365

gaa aac atg gag aca ata aat tct agc aca ctt gaa ctg aga agc aaa     1152
Glu Asn Met Glu Thr Ile Asn Ser Ser Thr Leu Glu Leu Arg Ser Lys
    370                 375                 380

tat tgg gca ata agg acc aga agc gga gga aac acc agt caa cag aga     1200
Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385                 390                 395                 400

gca tct gca gga cag ata agt gtg caa cct act ttc tca gta cag aga     1248
Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
                405                 410                 415

aat ctt ccc ttt gag aga gca acc att atg gct gca ttc act ggt aac     1296
Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
            420                 425                 430

act gaa gga agg act tcc gac atg aga acg gaa atc ata agg atg atg     1344
Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
        435                 440                 445

gaa aat gcc aaa tca gaa gat gtg tct ttc cag ggg cgg gga gtc ttc     1392
Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
    450                 455                 460

gag ctc tcg gac gaa aag gca acg aac ccg atc gtg cct tcc ttt gac     1440
Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465                 470                 475                 480

atg agc aat gaa ggg tct tat ttc ttc gga gac aat gct gag gag ttt     1488
Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
                485                 490                 495

gac agt taa                                                        1497
```

Asp Ser

<210> 72
<211> 498
<212> PRT
<213> Influenza virus

<400> 72

Met Ala Ser Gln Gly Thr Lys Arg Ser Tyr Glu Gln Met Glu Thr Asp
1 5 10 15

Gly Glu Arg Gln Asn Ala Thr Glu Ile Arg Ala Ser Val Gly Arg Met
20 25 30

Val Gly Gly Ile Gly Arg Phe Tyr Val Gln Met Cys Thr Glu Leu Lys
35 40 45

Leu Asn Asp His Glu Gly Arg Leu Ile Gln Asn Ser Ile Thr Ile Glu
50 55 60

Arg Met Val Leu Ser Ala Phe Asp Glu Arg Arg Asn Lys Tyr Leu Glu
65 70 75 80

Glu His Pro Ser Ala Gly Lys Asp Pro Lys Lys Thr Gly Gly Pro Ile
85 90 95

Tyr Arg Arg Lys Asp Gly Lys Trp Met Arg Glu Leu Ile Leu His Asp
100 105 110

Lys Glu Glu Ile Met Arg Ile Trp Arg Gln Ala Asn Asn Gly Glu Asp
115 120 125

Ala Thr Ala Gly Leu Thr His Met Met Ile Trp His Ser Asn Leu Asn
130 135 140

Asp Thr Thr Tyr Gln Arg Thr Arg Ala Leu Val Arg Thr Gly Met Asp
145 150 155 160

Pro Arg Met Cys Ser Leu Met Gln Gly Ser Thr Leu Pro Arg Arg Ser
165 170 175

```
Gly Ala Ala Gly Ala Ala Val Lys Gly Val Gly Thr Met Val Met Glu
            180                 185                 190

Leu Ile Arg Met Ile Lys Arg Gly Ile Asn Asp Arg Asn Phe Trp Arg
        195                 200                 205

Gly Glu Asn Gly Arg Arg Thr Arg Ile Ala Tyr Glu Arg Met Cys Asn
    210                 215                 220

Ile Leu Lys Gly Lys Phe Gln Thr Ala Ala Gln Arg Ala Met Met Asp
225                 230                 235                 240

Gln Val Arg Glu Gly Arg Asn Pro Gly Asn Ala Glu Ile Glu Asp Leu
                245                 250                 255

Ile Phe Leu Ala Arg Ser Ala Leu Ile Leu Arg Gly Ser Val Ala His
            260                 265                 270

Lys Ser Cys Leu Pro Ala Cys Val Tyr Gly Leu Ala Leu Thr Ser Gly
        275                 280                 285

Tyr Asp Phe Glu Lys Glu Gly Tyr Ser Leu Val Gly Ile Asp Pro Phe
    290                 295                 300

Lys Leu Leu Gln Asn Ser Gln Ile Phe Ser Leu Ile Arg Pro Lys Glu
305                 310                 315                 320

Asn Pro Ala His Lys Ser Gln Leu Val Trp Met Ala Cys His Ser Ala
                325                 330                 335

Ala Phe Glu Asp Leu Arg Val Leu Asn Phe Ile Arg Gly Thr Lys Val
            340                 345                 350

Ile Pro Arg Gly Gln Leu Thr Thr Arg Gly Val Gln Ile Ala Ser Asn
        355                 360                 365

Glu Asn Met Glu Thr Ile Asn Ser Ser Thr Leu Glu Leu Arg Ser Lys
    370                 375                 380

Tyr Trp Ala Ile Arg Thr Arg Ser Gly Gly Asn Thr Ser Gln Gln Arg
385                 390                 395                 400
```

```
Ala Ser Ala Gly Gln Ile Ser Val Gln Pro Thr Phe Ser Val Gln Arg
                405                 410                 415

Asn Leu Pro Phe Glu Arg Ala Thr Ile Met Ala Ala Phe Thr Gly Asn
            420                 425                 430

Thr Glu Gly Arg Thr Ser Asp Met Arg Thr Glu Ile Ile Arg Met Met
        435                 440                 445

Glu Asn Ala Lys Ser Glu Asp Val Ser Phe Gln Gly Arg Gly Val Phe
    450                 455                 460

Glu Leu Ser Asp Glu Lys Ala Thr Asn Pro Ile Val Pro Ser Phe Asp
465                 470                 475                 480

Met Ser Asn Glu Gly Ser Tyr Phe Phe Gly Asp Asn Ala Glu Glu Phe
                485                 490                 495

Asp Ser
```

<210> 73
<211> 1413
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1413)

<400> 73

```
atg aat cca aat caa aag ata ata gca att gga ttt gca tca ttg ggg       48
Met Asn Pro Asn Gln Lys Ile Ile Ala Ile Gly Phe Ala Ser Leu Gly
1               5                   10                  15

ata tta atc att aat gtc att ctc cat gta gtc agc att ata gta aca       96
Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
            20                  25                  30

gta ctg gtc ctc aat aac aat aga aca gat ctg aac tgc aaa ggg acg      144
Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
        35                  40                  45

atc ata aga gaa tac aat gaa aca gta aga gta gaa aaa ctt act caa      192
Ile Ile Arg Glu Tyr Asn Glu Thr Val Arg Val Glu Lys Leu Thr Gln
    50                  55                  60
```

```
tgg tat aat acc agt aca att aag tac ata gag aga cct tca aat gaa      240
Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65                  70                  75                  80

tac tac atg aat aac act gaa cca ctt tgt gag gcc caa ggc ttt gca      288
Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
                85                  90                  95

cca ttt tcc aaa gat aat gga ata cga att ggg tcg aga ggc cat gtt      336
Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
            100                 105                 110

ttt gtg ata aga gaa cct ttt gta tca tgt tcg ccc tca gaa tgt aga      384
Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
        115                 120                 125

acc ttt ttc ctc aca cag ggc tca tta ctc aat gac aaa cat tct aac      432
Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
    130                 135                 140

ggc aca ata aag gat cga agt ccg tat agg act ttg atg agt gtc aaa      480
Gly Thr Ile Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145                 150                 155                 160

ata ggg caa tca cct aat gta tat caa gct agg ttt gaa tcg gtg gca      528
Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
                165                 170                 175

tgg tca gca aca gca tgc cat gat gga aaa aaa tgg atg aca gtt gga      576
Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
            180                 185                 190

gtc aca ggg ccc gac aat caa gca att gca gta gtg aac tat gga ggt      624
Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
        195                 200                 205

gtt ccg gtt gat att att aat tca tgg gca ggg gat att tta aga acc      672
Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

caa gaa tca tca tgc acc tgc att aaa gga gac tgt tat tgg gta atg      720
Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240

act gat gga ccg gca aat agg caa gct aaa tat agg ata ttc aaa gca      768
Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255

aaa gat gga aga gta att gga caa act gat ata agt ttc aat ggg gga      816
Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

cac ata gag gag tgt tct tgt tac ccc aat gaa ggg aag gtg gaa tgc      864
His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
```

```
        275                 280                 285

ata tgc agg gac aat tgg act gga aca aat aga cca att ctg gta ata      912
Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Ile Leu Val Ile
    290                 295                 300

tct tct gat cta tcg tac aca gtt gga tat ttg tgt gct ggc att ccc      960
Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

act gac act cct agg gga gag gat agt caa ttc aca ggc tca tgt aca     1008
Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

agt cct ttg gga aat aaa gga tac ggt gta aaa ggc ttc ggg ttt cga     1056
Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
            340                 345                 350

caa gga act gac gta tgg gcc gga agg aca att agt agg act tca aga     1104
Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

tca gga ttc gaa ata ata aaa atc agg aat ggt tgg aca cag aac agt     1152
Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

aag gac caa atc agg agg caa gtg att atc gat gac cca aat tgg tca     1200
Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

gga tat agc ggt tct ttc aca ttg ccg gtt gaa ctg aca aaa aag gga     1248
Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
                405                 410                 415

tgt ttg gtc ccc tgt ttc tgg gtt gaa atg att aga ggt aaa cct gaa     1296
Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
            420                 425                 430

gaa aca aca ata tgg acc tct agc agc tcc att gtg atg tgt gga gta     1344
Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
        435                 440                 445

gat cat aaa att gcc agt tgg tca tgg cac gat gga gct att ctt ccc     1392
Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
    450                 455                 460

ttt gac atc gat aag atg taa                                        1413
Phe Asp Ile Asp Lys Met
465                 470
```

<210> 74
<211> 470
<212> PRT
<213> Influenza virus

<400> 74

Met Asn Pro Asn Gln Lys Ile Ile Ala Ile Gly Phe Ala Ser Leu Gly
1 5 10 15

Ile Leu Ile Ile Asn Val Ile Leu His Val Val Ser Ile Ile Val Thr
20 25 30

Val Leu Val Leu Asn Asn Asn Arg Thr Asp Leu Asn Cys Lys Gly Thr
35 40 45

Ile Ile Arg Glu Tyr Asn Glu Thr Val Arg Val Glu Lys Leu Thr Gln
50 55 60

Trp Tyr Asn Thr Ser Thr Ile Lys Tyr Ile Glu Arg Pro Ser Asn Glu
65 70 75 80

Tyr Tyr Met Asn Asn Thr Glu Pro Leu Cys Glu Ala Gln Gly Phe Ala
85 90 95

Pro Phe Ser Lys Asp Asn Gly Ile Arg Ile Gly Ser Arg Gly His Val
100 105 110

Phe Val Ile Arg Glu Pro Phe Val Ser Cys Ser Pro Ser Glu Cys Arg
115 120 125

Thr Phe Phe Leu Thr Gln Gly Ser Leu Leu Asn Asp Lys His Ser Asn
130 135 140

Gly Thr Ile Lys Asp Arg Ser Pro Tyr Arg Thr Leu Met Ser Val Lys
145 150 155 160

Ile Gly Gln Ser Pro Asn Val Tyr Gln Ala Arg Phe Glu Ser Val Ala
165 170 175

Trp Ser Ala Thr Ala Cys His Asp Gly Lys Lys Trp Met Thr Val Gly
180 185 190

Val Thr Gly Pro Asp Asn Gln Ala Ile Ala Val Val Asn Tyr Gly Gly
195 200 205

```
Val Pro Val Asp Ile Ile Asn Ser Trp Ala Gly Asp Ile Leu Arg Thr
    210                 215                 220

Gln Glu Ser Ser Cys Thr Cys Ile Lys Gly Asp Cys Tyr Trp Val Met
225                 230                 235                 240

Thr Asp Gly Pro Ala Asn Arg Gln Ala Lys Tyr Arg Ile Phe Lys Ala
                245                 250                 255

Lys Asp Gly Arg Val Ile Gly Gln Thr Asp Ile Ser Phe Asn Gly Gly
            260                 265                 270

His Ile Glu Glu Cys Ser Cys Tyr Pro Asn Glu Gly Lys Val Glu Cys
        275                 280                 285

Ile Cys Arg Asp Asn Trp Thr Gly Thr Asn Arg Pro Ile Leu Val Ile
    290                 295                 300

Ser Ser Asp Leu Ser Tyr Thr Val Gly Tyr Leu Cys Ala Gly Ile Pro
305                 310                 315                 320

Thr Asp Thr Pro Arg Gly Glu Asp Ser Gln Phe Thr Gly Ser Cys Thr
                325                 330                 335

Ser Pro Leu Gly Asn Lys Gly Tyr Gly Val Lys Gly Phe Gly Phe Arg
            340                 345                 350

Gln Gly Thr Asp Val Trp Ala Gly Arg Thr Ile Ser Arg Thr Ser Arg
        355                 360                 365

Ser Gly Phe Glu Ile Ile Lys Ile Arg Asn Gly Trp Thr Gln Asn Ser
    370                 375                 380

Lys Asp Gln Ile Arg Arg Gln Val Ile Ile Asp Asp Pro Asn Trp Ser
385                 390                 395                 400

Gly Tyr Ser Gly Ser Phe Thr Leu Pro Val Glu Leu Thr Lys Lys Gly
                405                 410                 415

Cys Leu Val Pro Cys Phe Trp Val Glu Met Ile Arg Gly Lys Pro Glu
            420                 425                 430
```

```
Glu Thr Thr Ile Trp Thr Ser Ser Ser Ser Ile Val Met Cys Gly Val
        435                 440                 445

Asp His Lys Ile Ala Ser Trp Ser Trp His Asp Gly Ala Ile Leu Pro
    450                 455                 460

Phe Asp Ile Asp Lys Met
465                 470
```

<210> 75
<211> 981
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(756)

<400> 75

```
atg agt ctt cta acc gag gtc gaa acg tac gtt ctc tct atc gta cca       48
Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1               5                   10                  15

tca ggc ccc ctc aaa gcc gag atc gcg cag aga ctt gaa gat gtc ttt       96
Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
            20                  25                  30

gcg gga aag aac acc gat ctt gag gca ctc atg gaa tgg cta aag aca      144
Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
        35                  40                  45

aga cca atc ctg tca cct ctg act aaa ggg att tta gga ttt gta ttc      192
Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
    50                  55                  60

acg ctc acc gtg ccc agt gag cga gga ctg cag cgt aga cgc ttt gtc      240
Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65                  70                  75                  80

caa aat gcc ctt agt gga aac gga gat cca aac aac atg gac aga gca      288
Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
                85                  90                  95

gta aaa ctg tac agg aag ctt aaa aga gaa ata aca ttc cat ggg gca      336
Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
            100                 105                 110

aaa gag gtg gca ctc agc tat tcc act ggt gca cta gcc agc tgc atg      384
Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
        115                 120                 125
```

```
gga ctc ata tac aac aga atg gga act gtt aca acc gaa gtg gca ttt      432
Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
    130                 135                 140

ggc ctg gta tgc gcc aca tgt gaa cag att gct gat tcc cag cat cga      480
Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145                 150                 155                 160

tct cac agg cag atg gtg aca aca acc aac cca tta atc aga cat gaa      528
Ser His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
                165                 170                 175

aac aga atg gta tta gcc agt acc acg gct aaa gcc atg gaa cag atg      576
Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
            180                 185                 190

gca gga tcg agt gag cag gca gca gag gcc atg gag gtt gct agt agg      624
Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
        195                 200                 205

gct agg cag atg gta cag gca atg aga acc att ggg acc cac cct agc      672
Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
    210                 215                 220

tcc agt gcc ggt ttg aaa gat gat ctc ctt gaa aat tta cag gcc tac      720
Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225                 230                 235                 240

cag aaa cgg atg gga gtg caa atg cag cga ttc aag tgatcctctc           766
Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys
                245                 250

gtcattgcag caagtatcat tgggatcttg cacttgatat tgtggattct tgatcgtctt    826

ttcttcaaat tcatttatcg tcgccttaaa tacgggttga aaagagggcc ttctacggaa    886

ggagtacctg agtctatgag ggaagaatat cggcaggaac agcagaatgc tgtggatgtt    946

gacgatggtc attttgtcaa catagagctg gagta                               981
```

<210> 76
<211> 252
<212> PRT
<213> Influenza virus

<400> 76

```
Met Ser Leu Leu Thr Glu Val Glu Thr Tyr Val Leu Ser Ile Val Pro
1               5                   10                  15

Ser Gly Pro Leu Lys Ala Glu Ile Ala Gln Arg Leu Glu Asp Val Phe
            20                  25                  30
```

Ala Gly Lys Asn Thr Asp Leu Glu Ala Leu Met Glu Trp Leu Lys Thr
35 40 45

Arg Pro Ile Leu Ser Pro Leu Thr Lys Gly Ile Leu Gly Phe Val Phe
50 55 60

Thr Leu Thr Val Pro Ser Glu Arg Gly Leu Gln Arg Arg Arg Phe Val
65 70 75 80

Gln Asn Ala Leu Ser Gly Asn Gly Asp Pro Asn Asn Met Asp Arg Ala
85 90 95

Val Lys Leu Tyr Arg Lys Leu Lys Arg Glu Ile Thr Phe His Gly Ala
100 105 110

Lys Glu Val Ala Leu Ser Tyr Ser Thr Gly Ala Leu Ala Ser Cys Met
115 120 125

Gly Leu Ile Tyr Asn Arg Met Gly Thr Val Thr Thr Glu Val Ala Phe
130 135 140

Gly Leu Val Cys Ala Thr Cys Glu Gln Ile Ala Asp Ser Gln His Arg
145 150 155 160

Ser His Arg Gln Met Val Thr Thr Thr Asn Pro Leu Ile Arg His Glu
165 170 175

Asn Arg Met Val Leu Ala Ser Thr Thr Ala Lys Ala Met Glu Gln Met
180 185 190

Ala Gly Ser Ser Glu Gln Ala Ala Glu Ala Met Glu Val Ala Ser Arg
195 200 205

Ala Arg Gln Met Val Gln Ala Met Arg Thr Ile Gly Thr His Pro Ser
210 215 220

Ser Ser Ala Gly Leu Lys Asp Asp Leu Leu Glu Asn Leu Gln Ala Tyr
225 230 235 240

Gln Lys Arg Met Gly Val Gln Met Gln Arg Phe Lys

245 250

<210> 77
<211> 1698
<212> DNA
<213> Influenza virus

<220>
<221> CDS
<222> (1)..(1698)

<400> 77

```
atg aag aca acc att att tta ata cta ctg acc cat tgg gcc tac agt       48
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1               5                  10                  15

caa aac cca atc agt ggc aat aac aca gcc aca ctg tgt ctg gga cac       96
Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30

cat gca gta gca aat gga aca ttg gta aaa aca atg agt gat gat caa      144
His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
        35                  40                  45

att gag gtg aca aat gct aca gaa tta gtt cag agc att tca atg ggg      192
Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
    50                  55                  60

aaa ata tgc aac aaa tca tat aga att cta gat gga aga aat tgc aca      240
Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65                  70                  75                  80

tta ata gat gca atg cta gga gac ccc cac tgt gac gcc ttt cag tat      288
Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
                85                  90                  95

gag agt tgg gac ctc ttt ata gaa aga agc agc gct ttc agc aat tgc      336
Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
            100                 105                 110

tac cca tat gac atc cct gac tat gca ccg ctc cga tcc att gta gca      384
Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Pro Leu Arg Ser Ile Val Ala
        115                 120                 125

tcc tca ggg aca gtg gaa ttc aca gca gag gga ttc aca tgg aca ggt      432
Ser Ser Gly Thr Val Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
    130                 135                 140

gta act caa aac gga aga agt gga gcc tgc aaa agg gga tca gcc gat      480
Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145                 150                 155                 160

agt ttc ttt agc cga ctg aat tgg cta aca aaa tct gga agc tct tac      528
```

```
Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
                165                 170                 175

ccc aca ttg aat gtg aca atg cct aac aat aaa aat ttc gac aag cta      576
Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
            180                 185                 190

tac atc tgg ggg att cat cac ccg agc tca aat caa gag cag aca aaa      624
Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
        195                 200                 205

ttg tac atc caa gaa tca gga cga gta aca gtc tca aca aaa aga agt      672
Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
    210                 215                 220

caa caa aca ata atc cct aac atc gga tct aga ccg ttg gtc aga ggt      720
Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225                 230                 235                 240

caa tca ggc agg ata agc ata tac tgg acc att gta aaa cct gga gat      768
Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
                245                 250                 255

atc cta atg ata aac agt aat ggc aac tta gtt gca ccg cgg gga tat      816
Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
            260                 265                 270

ttt aaa ttg aac aca ggg aaa agc tct gta atg aga tcc gat gta ccc      864
Phe Lys Leu Asn Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
        275                 280                 285

ata gac att tgt gtg tct gaa tgt att aca cca aat gga agc atc tcc      912
Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
    290                 295                 300

aac gac aag cca ttc caa aat gtg aac aaa gtt aca tat gga aaa tgc      960
Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305                 310                 315                 320

ccc aag tat atc agg caa aac act tta aag ctg gcc act ggg atg agg     1008
Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
                325                 330                 335

aat gta cca gaa aag caa acc aga gga atc ttt gga gca ata gcg gga     1056
Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
            340                 345                 350

ttc atc gaa aac ggc tgg gaa gga atg gtt gat ggg tgg tat ggg ttc     1104
Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
        355                 360                 365

cga tat caa aac tct gaa gga aca ggg caa gct gca gat cta aag agc     1152
Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
    370                 375                 380
```

```
act caa gca gcc atc gac cag att aat gga aag tta aac aga gtg att     1200
Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385                 390                 395                 400

gaa aga acc aat gag aaa ttc cat caa ata gag aag gaa ttc tca gaa     1248
Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
                405                 410                 415

gta gaa gga aga att cag gac ttg gag aaa tat gta gaa gac acc aaa     1296
Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
            420                 425                 430

ata gac cta tgg tcc tac aat gca gaa ttg ctg gtg gct cta gaa aat     1344
Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn
        435                 440                 445

caa cat aca att gac tta aca gat gca gaa atg aat aaa tta ttt gag     1392
Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
    450                 455                 460

aag act aga cgc cag tta aga gaa aac gca gaa gac atg gga ggt gga     1440
Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465                 470                 475                 480

tgt ttc aag att tac cac aaa tgt gat aat gca tgc att gaa tca ata     1488
Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Glu Ser Ile
                485                 490                 495

aga act ggg aca tat gac cat tac ata tac aaa gat gaa gca tta aac     1536
Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Lys Asp Glu Ala Leu Asn
            500                 505                 510

aat cga ttt cag atc aaa ggt gta gag ttg aaa tca ggc tac aaa gat     1584
Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
        515                 520                 525

tgg ata ctg tgg att tca ttc gcc ata tca tgc ttc tta att tgc gtt     1632
Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
    530                 535                 540

gtt cta ttg ggt ttc att atg tgg gct tgc caa aaa ggc aac atc aga     1680
Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
545                 550                 555                 560

tgc aac att tgc att tga                                            1698
Cys Asn Ile Cys Ile
                565
```

<210> 78
<211> 565
<212> PRT
<213> Influenza virus

<400> 78

```
Met Lys Thr Thr Ile Ile Leu Ile Leu Leu Thr His Trp Ala Tyr Ser
1               5                  10                  15

Gln Asn Pro Ile Ser Gly Asn Asn Thr Ala Thr Leu Cys Leu Gly His
            20                  25                  30

His Ala Val Ala Asn Gly Thr Leu Val Lys Thr Met Ser Asp Asp Gln
        35                  40                  45

Ile Glu Val Thr Asn Ala Thr Glu Leu Val Gln Ser Ile Ser Met Gly
    50                  55                  60

Lys Ile Cys Asn Lys Ser Tyr Arg Ile Leu Asp Gly Arg Asn Cys Thr
65                  70                  75                  80

Leu Ile Asp Ala Met Leu Gly Asp Pro His Cys Asp Ala Phe Gln Tyr
                85                  90                  95

Glu Ser Trp Asp Leu Phe Ile Glu Arg Ser Ser Ala Phe Ser Asn Cys
            100                 105                 110

Tyr Pro Tyr Asp Ile Pro Asp Tyr Ala Pro Leu Arg Ser Ile Val Ala
        115                 120                 125

Ser Ser Gly Thr Val Glu Phe Thr Ala Glu Gly Phe Thr Trp Thr Gly
    130                 135                 140

Val Thr Gln Asn Gly Arg Ser Gly Ala Cys Lys Arg Gly Ser Ala Asp
145                 150                 155                 160

Ser Phe Phe Ser Arg Leu Asn Trp Leu Thr Lys Ser Gly Ser Ser Tyr
                165                 170                 175

Pro Thr Leu Asn Val Thr Met Pro Asn Asn Lys Asn Phe Asp Lys Leu
            180                 185                 190

Tyr Ile Trp Gly Ile His His Pro Ser Ser Asn Gln Glu Gln Thr Lys
        195                 200                 205

Leu Tyr Ile Gln Glu Ser Gly Arg Val Thr Val Ser Thr Lys Arg Ser
    210                 215                 220
```

Gln Gln Thr Ile Ile Pro Asn Ile Gly Ser Arg Pro Leu Val Arg Gly
225 230 235 240

Gln Ser Gly Arg Ile Ser Ile Tyr Trp Thr Ile Val Lys Pro Gly Asp
245 250 255

Ile Leu Met Ile Asn Ser Asn Gly Asn Leu Val Ala Pro Arg Gly Tyr
260 265 270

Phe Lys Leu Asn Thr Gly Lys Ser Ser Val Met Arg Ser Asp Val Pro
275 280 285

Ile Asp Ile Cys Val Ser Glu Cys Ile Thr Pro Asn Gly Ser Ile Ser
290 295 300

Asn Asp Lys Pro Phe Gln Asn Val Asn Lys Val Thr Tyr Gly Lys Cys
305 310 315 320

Pro Lys Tyr Ile Arg Gln Asn Thr Leu Lys Leu Ala Thr Gly Met Arg
325 330 335

Asn Val Pro Glu Lys Gln Thr Arg Gly Ile Phe Gly Ala Ile Ala Gly
340 345 350

Phe Ile Glu Asn Gly Trp Glu Gly Met Val Asp Gly Trp Tyr Gly Phe
355 360 365

Arg Tyr Gln Asn Ser Glu Gly Thr Gly Gln Ala Ala Asp Leu Lys Ser
370 375 380

Thr Gln Ala Ala Ile Asp Gln Ile Asn Gly Lys Leu Asn Arg Val Ile
385 390 395 400

Glu Arg Thr Asn Glu Lys Phe His Gln Ile Glu Lys Glu Phe Ser Glu
405 410 415

Val Glu Gly Arg Ile Gln Asp Leu Glu Lys Tyr Val Glu Asp Thr Lys
420 425 430

Ile Asp Leu Trp Ser Tyr Asn Ala Glu Leu Leu Val Ala Leu Glu Asn

435 440 445

Gln His Thr Ile Asp Leu Thr Asp Ala Glu Met Asn Lys Leu Phe Glu
450 455 460

Lys Thr Arg Arg Gln Leu Arg Glu Asn Ala Glu Asp Met Gly Gly Gly
465 470 475 480

Cys Phe Lys Ile Tyr His Lys Cys Asp Asn Ala Cys Ile Glu Ser Ile
485 490 495

Arg Thr Gly Thr Tyr Asp His Tyr Ile Tyr Lys Asp Glu Ala Leu Asn
500 505 510

Asn Arg Phe Gln Ile Lys Gly Val Glu Leu Lys Ser Gly Tyr Lys Asp
515 520 525

Trp Ile Leu Trp Ile Ser Phe Ala Ile Ser Cys Phe Leu Ile Cys Val
530 535 540

Val Leu Leu Gly Phe Ile Met Trp Ala Cys Gln Lys Gly Asn Ile Arg
545 550 555 560

Cys Asn Ile Cys Ile
565

<210> 79
<211> 20
<212> DNA
<213> Influenza virus

<400> 79
tatgcatcgc tccgatccat 20

<210> 80
<211> 21
<212> DNA
<213> Influenza virus

<400> 80
gctccacttc ttccgttttg a 21

<210> 81
<211> 30

<212> DNA
<213> Influenza virus

<400> 81
aattcacagc agagggattc acatggacag 30

<210> 82
<211> 24
<212> DNA
<213> Influenza Virus

<220>
<221> variation
<222> (7)..(7)
<223> r = a or g

<400> 82
catggartgg ctaaagacaa gacc 24

<210> 83
<211> 24
<212> DNA
<213> Influenza virus

<220>
<221> variation
<222> (18)..(18)
<223> k = g or t

<400> 83
agggcatttt ggacaaakcg tcta 24

<210> 84
<211> 18
<212> DNA
<213> Influenza virus

<400> 84
acgctcaccg tgcccagt 18

<210> 85
<211> 28
<212> DNA
<213> Influenza virus

<400> 85
tattcgtctc agggagcaaa agcagggg 28

<210> 86
<211> 42
<212> DNA
<213> Influenza virus

<400> 86
tgtaatacga ctcactatag ggctccactt cttccgtttt ga 42

<210> 87
<211> 30
<212> DNA
<213> Influenza virus

<400> 87
gatcgctctt cagggagcaa aagcaggtag 30

<210> 88
<211> 40
<212> DNA
<213> Influenza virus

<400> 88
tgtaatacga ctcactatag ggcattttgg acaaagcgtc 40