SEQUENCE LISTING

<110> MAYO FOUNDATION FOR MEDICAL EDUCATION AND RESEARCH

<120> CANINE DISTEMPER VIRUS HEMAGGLUTININ AND FUSION POLYPEPTIDES

<130> 07039-1936WO1

<140> PCT/US2020/055100
<141> 2020-10-09

<150> 62/913,111
<151> 2019-10-09

<160> 228

<170> PatentIn version 3.5

<210> 1
<211> 1824
<212> DNA
<213> Canine morbillivirus

<400> 1
atgctctcct accaagacaa ggtgggtgcc ttctacaagg ataatgcaag agctaatttg 60

tccaagctgt ccttagtgac agaagagcaa gggggcagga gaccacccta tttgctgttt 120

gtccttctca tcctactggt tggaatcctg gccttgcttg ctatcactgg agttcgattt 180

caccaggtat caattagcaa tatggaattt agcagattgt tgaaagagga tatggagaag 240

tcagatgccg tacatcacca agtcatagat gtcttgacac cgctcttcaa aattattgga 300

gatgagattg ggttacggtt gccacaaaaa ctaaacgaga tcaaacaatt tatccttcaa 360

aagactaact tcttcaatcc gaacagggaa ttcgacttcc gcgatctcca ctggtgcatt 420

aatccgccta gtaagatcaa agtgaatttt actagttact gtgatacaat tgggatcaga 480

aaatccattg cattggcagc aaatcccatc ctttttcag cactctccgg aggcagaggt 540

gacatattcc caccatacag atgcagtgga gctactactt cagttggcaa atctttcccc 600

ctatcagtat cattatccat gtctttgatc tcaagaacat cagagataat caatatgctg 660

acctctatct cagacggagt gtatggtaaa acttatttgc tagtgcctga ttatattgaa 720

ggggagttcg acacgcaaaa gattcgagtc tttgagatag ggttcatcaa aaggtggctg 780

aatgacatgc cattattcca gacaaccaac tatatgatcc tcccggagaa ttctaaaacc 840

aaagtatgta ctatagcagt gggcgagttg acactggctt ccttgtgtgt agatgagagc 900

actgtattat tatatcatga cagcaatgat tcacaagatg gtattctagt agtgacgctg 960

ggaatctttg gggcaacacc tatggatcaa gtcgaagagg tgatacctgt cgctcaccca 1020

tcagtagaaa aaatacatat aacaaatcac cgtggtttca taaaagattc ggtagcaacc 1080

tggatggtgc ctgcattggt ctctgagaac ctagaggaac aaaaaaattg tctggagtcg 1140

gcttgtcaaa gaaaatccta ccctatgtgc aaccaaacat catgggaacc ctttggagga 1200

ggacagttgc catcttatgg gcggttgacg ttacatctag atgcaagcac tgaccgtcaa 1260

cttaacatat catttacgta cggtccggtt atactgaatg gaaatggtat ggattattat 1320

gaaagcccac ttttggactc cggatggctt accattcctc ctaagaatgg aacaattctt 1380

ggattgataa acaaagcaag tagaggagac cagttcactg tgatccctca tgtgttgtca 1440

tttgcgccca gggaatcaag tggaaactgt tatttaccta ttcaaacatc ccagattatg 1500

gataaagatg tccttactga gtctaattta gttgtgttgc ctacacagaa ttttagatat 1560

gtcatagcaa catatgatat atcccgaaac gatcatgcga ttgtttatta tgtttatgac 1620

ccaatccgga cgatttctta tacgtaccca tttagactaa ctaccaaggg tagatctgat 1680

ttcctaagga ttgaatgttt tgtgtgggat gacgacctgt ggtgtcacca attttacagg 1740

ttcgaggctg acatcaccaa ctctacaacc agtgttgaga atttagtccg tataagattc 1800

tcctgtaacc gttcaaaacc ttga 1824

<210> 2
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 2
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser

```
    50                  55                  60

Ile Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Phe Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

```
Ile Leu Pro Glu Asn Ser Lys Thr Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Asp Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Thr Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asn Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Ser Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 3
<211> 1989
<212> DNA
<213> Canine morbillivirus

<400> 3

```
atgcacaagg aaatccccga aaaatccaga acccgaacac acacccaaca agacctcccc       60

caacaaaaaa gcaccgaata caccgagatc aagacctccc gagcacgaca cggcataacg      120

ccagctcagc gatccacgca ctatggtcct cgaacattgg acaggctcgt ctgctacatt      180

atgaacagag ccatgtcttg caagcaagcc agctacagat cggataacat cccagctcac      240

ggagaccacg agggtgttgt ccatcacaca ccagagagtg tctcccaagg agcgagatcc      300

cagctcaaga ggcggacttc caatgcaatc aactcaggat ttcagtacat ctggttagtc      360

ctgtggtgca tcggaatagc cagtctcttt ctttgttcta aggctcagat acattggaat      420
```

aatttatcaa ctattgggat catcgggact gacagtgtcc attataagat catgactagg 480

cccagccacc agtacttggt cataaaacta atgcctaatg tttcactcat agataattgt 540

accaaagcag aattaggtga gtatgagaaa ttattaaatt cagtcctcga accaatcaac 600

caagctttga ctctaatgac caagaatgtg aagcctctac agtcagtagg gtcaggtagg 660

agacagaggc gttttgcagg agtggtgctt gcaggtgcag ctttaggagt ggccactgct 720

gcacaaatca ctgcagggat agctttacat caatccaacc tcaatgctca agcaatccaa 780

tctctgagaa ctagccttga acagtccaac aaggctatag aagaaattag ggaggcaacc 840

caggaaaccg tcattgccgt tcagggagtc caggattacg tcaataatga actcgtccct 900

gctatacaac atatgtcgtg tgaattagtt gggcagagat tagggttaaa attgcttagg 960

tattataccg agttgttgtc aatatttggc ccgagtttac gtgatcctat ttcagccgag 1020

atatcaattc aagcactgag ttatgctctt gggggagaaa ttcataagat acttgagacg 1080

ttggggtatt ctggaaatga tatgattgca attttggaga gtcgggggat aaaaacaaga 1140

ataactcatg ttgatctccc cgggaaattt atcatcttaa gtatctcata cccaacttta 1200

tcagaagtca agggggttat agtccacaga ctggaagcag tttcttataa catagggtca 1260

caagagtggt acaccactgt cccgaggtat gttgcaacta atggttactt aatatccaat 1320

ttcgatgagt catcctgtgt attcgtctca gaatcagcca tttgtagcca gaactcccta 1380

taccccatga gcccacttct acaacaatgc attaggggcg acacttcatc ttgtgctcgg 1440

accttggtgt ctggaaccat gggcaataaa tttattctgt caaaaggcaa tatcatcgca 1500

aattgtgctt ctatactatg taagtgttat agcacaagca caattatcaa tcagagtcct 1560

gataagttgc tgacctttat tgcctccgat acatgcccac tagttgaaat agatggtgta 1620

accatccagg ttggaggcag gcaataccct gatatggtat acgaaagcaa agttgcccta 1680

ggccctgcta tatcacttga gaggctagat gtaggtacaa atttagggaa cgcccttaag 1740

aaactggatg atgctaaggt actgatagac tcatctaatc agatccttga gacggttagg 1800

cgctcttcct ttaattttgg cagtctcctc agcgttccta tattaagctg tgcagccctg 1860

gctttgttat tgctgattta ctgctgtaaa agacgctatc aacagacact caagcggaat 1920

actaaggtcg atccgacatt taaacctgat ctgactggga cttctaaatc ctatgtaaga 1980

tcactctga 1989

<210> 4
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 4
Met His Lys Glu Ile Pro Glu Lys Ser Arg Thr Arg Thr His Thr Gln
1   5   10   15

Gln Asp Leu Pro Gln Gln Lys Ser Thr Glu Tyr Thr Glu Ile Lys Thr
            20   25   30

Ser Arg Ala Arg His Gly Ile Thr Pro Ala Gln Arg Ser Thr His Tyr
        35   40   45

Gly Pro Arg Thr Leu Asp Arg Leu Val Cys Tyr Ile Met Asn Arg Ala
    50   55   60

Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65   70   75   80

Gly Asp His Glu Gly Val Val His His Thr Pro Glu Ser Val Ser Gln
                85   90   95

Gly Ala Arg Ser Gln Leu Lys Arg Arg Thr Ser Asn Ala Ile Asn Ser
            100   105   110

Gly Phe Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu

```
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Ile Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Thr Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Arg Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400
```

```
Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Ile Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605
```

```
Leu Leu Ser Val Pro Ile Leu Ser Cys Ala Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 5
<211> 604
<212> PRT
<213> Canine morbillivirus

<400> 5
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


Arg Ala Asn Ser Thr Lys Leu Ser Leu Val Thr Glu Glu His Gly Gly
            20                  25                  30


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125
```

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Glu Ser Ile Gly Ile Arg
145                 150                 155                 160

Lys Ala Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro His Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Glu Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Trp Ala Thr Pro Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Val Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Leu Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Trp Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Ile Val Val
            500                 505                 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Ser Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Ala Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg
        595                 600


<210> 6
<211> 135
<212> PRT
<213> Canine morbillivirus

<400> 6
Met His Lys Glu Ile Pro Glu Lys Ser Arg Thr Arg Thr His Thr Gln
1               5                   10                  15


Gln Asp Leu Pro Gln Gln Lys Ser Thr Glu Tyr Thr Glu Ile Lys Thr
            20                  25                  30


Ser Arg Ala Arg His Gly Ile Thr Pro Ala Gln Arg Ser Thr His Tyr
        35                  40                  45


Gly Pro Arg Thr Leu Asp Arg Leu Val Cys Tyr Ile Met Asn Arg Ala
    50                  55                  60


Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80


Gly Asp His Glu Gly Val Val His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95


Gly Ala Arg Ser Gln Leu Lys Arg Arg Thr Ser Asn Ala Ile Asn Ser
            100                 105                 110


Gly Phe Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125
```

Leu Phe Leu Cys Ser Lys Ala
130 135

<210> 7
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 7
Met His Lys Gly Ile Pro Lys Ser Ser Lys Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Arg Pro Pro Gln Pro Ser Thr Glu Pro Glu Glu Thr Arg Thr
20 25 30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
35 40 45

Asp Pro Arg Thr Ser Asp Arg Pro Val Ser Tyr Thr Met Asp Arg Ile
50 55 60

Arg Ser Arg Lys Gln Thr Ser His Arg Leu Lys Asn Ile Pro Val His
65 70 75 80

Gly Asn His Glu Ala Ile Ile Gln His Ile Pro Glu Ser Val Ser Lys
85 90 95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Arg Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Gly Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590
```

```
Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640


Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 8
<211> 75
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      polypeptide

<400> 8
Met Asn Arg Ala Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn
1               5                   10                  15


Ile Pro Ala His Gly Asp His Glu Gly Val Val His His Thr Pro Glu
            20                  25                  30


Ser Val Ser Gln Gly Ala Arg Ser Gln Leu Lys Arg Arg Thr Ser Asn
        35                  40                  45


Ala Ile Asn Ser Gly Phe Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile
    50                  55                  60


Gly Ile Ala Ser Leu Phe Leu Cys Ser Lys Ala
65                  70                  75


<210> 9
<211> 31
<212> PRT
```

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 9
Met Thr Ser Asn Ala Ile Asn Ser Gly Phe Gln Tyr Ile Trp Leu Val
1 5 10 15

Leu Trp Cys Ile Gly Ile Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25 30

<210> 10
<211> 26
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

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

Val Leu Leu Thr Leu Gln Thr Pro Thr Gly
20 25

<210> 11
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 11
Met Ala Ile Asn Ser Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Leu Gly Ile Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 12
<211> 28

<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 12
Met Ala Ile Asn Ser Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Leu Gly Met Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 13
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 13
Met Ala Ile Asn Ser Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Phe Gly Thr Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 14
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 14
Met Ala Thr Ser Pro Gly Pro Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Ile Gly Ile Ala Ser Leu Phe Leu Cys Ser Glu Ala
20 25

<210> 15

<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 15
Met Ala Val Lys Ser Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Ile Gly Val Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 16
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 16
Met Ala Ser Asn Pro Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Ile Gly Ile Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 17
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 17
Met Ala Thr Asn Ala Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Ile Gly Ile Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 18
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 18
Met Ala Thr Ser Ser Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Ile Gly Val Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 19
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 19
Met Ala Ile Asn Ser Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys
1 5 10 15

Ile Gly Val Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 20
<211> 28
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

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

Ile Gly Ile Ala Ser Leu Phe Leu Cys Ser Lys Ala
20 25

<210> 21
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
6xHis tag

<400> 21
His His His His His His
1 5

<210> 22
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 22
agaaaactta gggctcaggt agtcc 25

<210> 23
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 23
tcgtctgtaa gggatttctc acc 23

<210> 24
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 24
aggacatagc aagccaacag g 21

<210> 25
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 25
ggactacctg agccctaagt tttct 25

<210> 26
<211> 64
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 26
ccggtagtta attaaaactt agggtgcaag atcatcgata atgctctcct accaagataa 60

ggtg 64

<210> 27
<211> 90
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
primer

<400> 27
ctatttcaca ctagtgggta tgcctgatgt ctgggtgaca tcatgtgatt ggttcactag 60

cagcctcaag gttttgaacg gttacaggag 90

<210> 28
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
peptide

<400> 28
Asp Tyr Lys Asp Asp Asp Asp
1   5

<210> 29
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      peptide

<400> 29
Gly Ser Ser Gly Gly Ser Ser Ser Gly
1   5

<210> 30
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic
      peptide

<400> 30
Ser Ser Gly Gly Gly Gly Ser
1   5

<210> 31
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 31
Met Leu Ser Tyr Gln Asp Lys Ala Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

Arg Ala Asn Ser Thr Lys Leu Ser Leu Val Thr Glu Glu His Gly Gly
            20   25   30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Val Leu Leu Val Gly
        35   40   45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

```
Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Ser Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Glu Ser Ile Gly Ile Arg
145                 150                 155                 160

Lys Ala Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Pro
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro His Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Ala Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Ser Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

```
Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Glu Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Thr Thr Pro Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Pro Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480
```

```
Phe Ala Pro Met Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Ser Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asn Ile Ala Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Asn Pro
        595                 600                 605
```

<210> 32
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 32

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Pro Ser Lys Leu Ser Leu Val Thr Glu Glu His Gly Gly
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ser Ile Thr Gly Val Arg Phe His Lys Val Ser
    50                  55                  60
```

```
Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Glu Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Val Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

```
Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Glu Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Arg Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Ser Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Val Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Gly Gly Asn Cys Tyr Leu Pro Ile Gln Thr
```

485 490 495

Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Phe Arg Thr
530 535 540

Ile Phe Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Tyr Glu Ala Asn Ile Ala Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Asn Pro
595 600 605

<210> 33
<211> 604
<212> PRT
<213> Canine morbillivirus

<400> 33
Met Leu Pro Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

Arg Ala Asn Ser Thr Lys Leu Ser Leu Val Thr Glu Gly His Gly Gly
20 25 30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

```
Thr Ser Asn Ile Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Glu Ser Ile Gly Ile Arg
145                 150                 155                 160

Lys Ala Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro His Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
```

```
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Glu Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Trp Ala Thr Pro Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Phe Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Leu Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Ile Val Val
500 505 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Ser Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Ala Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg
595 600

<210> 34
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 34
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

Arg Ala Asn Pro Ser Lys Leu Ser Leu Val Thr Glu Glu His Gly Gly
20 25 30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ser Ile Thr Gly Val Arg Phe His Lys Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys

```
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ser Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Val Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Arg Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Val Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Gly Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Phe Arg Thr
530 535 540

Ile Phe Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Tyr Glu Ala Asn Ile Ala Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Asn Pro
595 600 605

<210> 35
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 35
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

Arg Ala Asn Ser Ser Lys Leu Ser Pro Val Thr Glu Glu His Gly Gly
20 25 30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Glu Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Arg Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Thr Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Glu Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Arg Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Arg Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro Gln Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Cys Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

```
Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Val Val Val
            500                 505                 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Tyr Glu Ala Asn Ile Ala Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Asn Pro
        595                 600                 605
```

<210> 36
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 36

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Pro Ser Lys Leu Ser Leu Val Thr Glu Glu His Gly Gly
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ser Ile Thr Gly Val Arg Phe His Lys Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ser Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Val Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Asp Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Arg Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp His Ile Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Met Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Gly Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Val Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Gly Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Ile Asp Arg Asp Val Leu Ile Glu Ser Asn Leu Val Val
```

```
            500                 505                 510

Leu Pro Thr Gln Ser Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Phe Arg Thr
    530                 535                 540

Ile Phe Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asn Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Tyr Glu Ala Asn Ile Ala Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Asn Pro
        595                 600                 605


<210> 37
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 37
Met Leu Ser Tyr Gln Asp Lys Val Ser Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val His Asp Tyr Ile Glu
225                 230                 235                 240

Gly Gly Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
```

```
    290                 295                 300

Tyr His Asp Ser Asp Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Ala Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Ser Thr Val Ile Pro His Val Phe Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ala
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ser Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 38
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 38
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe

```
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Ser Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Gly Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Trp Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Ile Ile Pro His Val Trp Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Ile Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Ile
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 39
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 39
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

```
Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Tyr Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Ile Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Met Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Met Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Ala Pro Ser
                405                 410                 415

Ile Asp Leu Arg Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Glu Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

```
Leu Pro Thr Gln Asn Phe Arg Tyr Val Thr Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Gln Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Ser Arg Ser Lys Pro
        595                 600                 605
```

<210> 40
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 40

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95
```

```
Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Pro Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Val Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Ile Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Ser Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asn Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Gly Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
```

```
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys His Arg Ser Lys Pro
        595                 600                 605
```

<210> 41
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 41

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95
```

```
Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala His Thr
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Ile Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
```

```
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Ser Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asn Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Gly Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Ser Arg Ser Lys Pro
595 600 605

<210> 42
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 42
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

Arg Ala Asn Ser Ser Arg Leu Ser Leu Val Thr Glu Asp Gln Gly Gly
20 25 30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn

```
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Ser Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Ser Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Leu Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Pro His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Ile Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

```
Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Ala Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 43
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 43

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Arg
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

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

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Arg Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Val Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Leu Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Val Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Ala Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Arg
                405                 410                 415

Thr Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Ile Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Thr
        515                 520                 525
```

```
Arg Asp Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Ile Ser Val
            580                 585                 590

Glu Thr Leu Asp Pro Ile Arg Ser Ser Cys Lys Arg Ser Gly Pro
        595                 600                 605
```

<210> 44
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 44

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

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

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Val Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Ala Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Thr Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Ile Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
```

```
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Ser Arg Ser Arg Pro
        595                 600                 605
```

<210> 45
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 45

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Thr Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

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

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Thr Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Ala Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
```

```
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Arg Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Thr Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Ile Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ala Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Arg Pro
        595                 600                 605


<210> 46
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 46
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Thr Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


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


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
```

```
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Thr Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Lys Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Ala Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Met Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Thr Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Ile Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ala Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Arg Pro
595 600 605

<210> 47
<211> 601
<212> PRT
<213> Canine morbillivirus

<400> 47
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

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

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Ala Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Ser Ile Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Thr Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Ile Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser
        595                 600


<210> 48
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 48
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Thr Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


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


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125
```

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Thr Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Lys Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Ala Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Thr Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Ile Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
```

545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ala Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Arg Pro
595 600 605

<210> 49
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 49
Met Leu Ser Tyr Arg Asp Lys Val Asp Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Leu Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Thr
            180                 185                 190

Ile Ser Val Gly Lys Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Met Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala Asp Pro Leu Val Glu Lys Ile His Ile Thr Asn His Arg Gly
```

```
            340                 345                 350

Ile Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Ile Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Ser Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560
```

```
Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Met Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 50
<211> 80
<212> PRT
<213> Canine morbillivirus

<400> 50
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


Arg Ala Asn Ser Ser Arg Leu Ser Leu Val Thr Glu Asp Gln Gly Gly
            20                  25                  30


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


<210> 51
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 51
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


Arg Ala Asn Ser Ser Arg Leu Ser Leu Val Thr Glu Asp Gln Gly Gly
            20                  25                  30
```

```
Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Ser Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Ser Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Leu Glu
225                 230                 235                 240
```

```
Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Pro His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
```

```
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Ile Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Ala Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 52
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 52
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Ser Arg Leu Ser Leu Val Thr Glu Glu Gln Gly Gly
            20                  25                  30
```

```
Lys Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Val Phe Pro Ser Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Leu Glu
225                 230                 235                 240

Gly Glu Phe Asp Met Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
```

```
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Ala Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Arg Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Met Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 53
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 53
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
```

```
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Val Phe Pro Ser Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Leu Glu
225                 230                 235                 240

Gly Glu Phe Asp Met Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Ala Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Arg Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Met Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 54
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 54
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45
```

```
Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Val Phe Pro Ser Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Leu Glu
225                 230                 235                 240

Gly Glu Phe Asp Met Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Ala Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Arg Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Arg Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Met Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 55
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 55
Met Leu Ser Tyr Gln Asp Lys Val Ser Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45
```

```
Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Gly Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asp Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
```

```
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ala
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ser Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 56
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 56
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45
```

```
Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Ser Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
```

```
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Gly Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Trp Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Ile Ile Pro His Val Trp Thr
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Ile Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Thr Asp Ser Thr Asn Ser Thr Thr Ser Ile
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 57
<211> 607
<212> PRT
<213> Canine morbillivirus


<220>
<221> MOD_RES
<222> (295)..(295)
<223> Any amino acid

<400> 57
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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

```
Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Ile Asn Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Ile Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240
```

```
Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Xaa Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Asp Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Thr Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asn Gly Met Asp Tyr Tyr Glu Ser Pro Leu Met Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
```

```
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Ser Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 58
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 58
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

```
Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ala Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
```

```
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Ala Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Gly Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 59
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 59
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
```

```
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Ile Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Ile Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Asp Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Thr Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asn Gly Met Asp Tyr Tyr Glu Ser Pro Leu Met Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Ser Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 60
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 60
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45
```

```
Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Ile Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Ser Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Lys Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro His Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Ile Leu Ala Ser Leu Cys Val Glu Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Lys Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 61
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 61
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45
```

```
Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Ile Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Val Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Glu Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Ile Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
```

```
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Asn Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 62
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 62
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45
```

```
Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Ile Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
```

```
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Glu Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Ile Asp Arg Gln Ile Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Arg Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 63
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 63
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
```

```
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Glu Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Val Thr
            180                 185                 190

Thr Ser Val Gly Glu Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

```
Ile Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Val Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480
```

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
485 490 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Gly Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Lys Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 64
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 64
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

```
Ile Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Phe Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Ser Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ser Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

```
Ile Leu Pro Glu Asn Ser Lys Thr Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Asp Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Thr Asp Arg Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asn Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Ser
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Ser Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 65
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 65

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60
```

```
Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Leu Thr Asn Tyr Cys Asp Thr Ile Gly Leu Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Phe Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

```
Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
```

485 490 495

Phe Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Phe Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Phe Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 66
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 66
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

```
Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Leu Thr Asn Tyr Cys Asp Thr Ile Gly Leu Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Phe Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
```

```
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

```
Phe Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Lys Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Lys
    530                 535                 540

Ile Ser Phe Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asp Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 67
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 67

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
```

```
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Leu Thr Asn Tyr Cys Asp Thr Ile Gly Leu Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Phe Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

Leu Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Asn Leu Glu Glu Gln Glu Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

```
Phe Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Lys
    530                 535                 540

Ile Ser Phe Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Phe Pro Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 68
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 68

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Leu Thr Asn Tyr Cys Asp Thr Ile Gly Leu Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Phe Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

```
Phe Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Lys
    530                 535                 540

Ile Ser Phe Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Phe Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 69
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 69

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Ser Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Pro Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Gly
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Arg Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Arg Asp Val Leu Thr Glu Ser Asn Leu Val Val
```

```
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Asn Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 70
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 70
Met Leu Ser Tyr His Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Phe Leu Leu Phe Val Leu Leu Val Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Ser
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Ala
            180                 185                 190

Thr Ser Ala Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
```

```
    290                 295                 300

Tyr His Asp Ser Asp Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ile Ser
        355                 360                 365

Gly Glu Gln Glu Glu Gln Lys Asn Cys Leu Glu Leu Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Asp
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Phe Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Gly Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Gly Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys His
595 600 605

<210> 71
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 71
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Phe Leu Leu Phe Val Leu Leu Val Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Asp Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe

```
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Ile Ile Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ile Ser
        355                 360                 365

Gly Glu Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Gly
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Arg Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

```
Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Ile Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val His Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 72
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 72

```
Met Leu Ser Tyr Gln Asp Lys Val Ser Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Ser Lys Leu Ser Leu Val Thr Glu Glu His Gly Ser
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Ala Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95
```

```
Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Lys
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Asn Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Gly
                405                 410                 415

Ile Asp Leu Gln Leu Asn Leu Ser Phe Thr Tyr Gly Pro Ile Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Tyr Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 73
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 73
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
85 90 95

```
Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Ser Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Ala
            180                 185                 190

Thr Ser Ile Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Asp Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Glu Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Ser Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Trp Gly Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Lys Ala Ile Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Met Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Gly Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ala Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
```

```
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 74
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 74

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Ser Lys Leu Ser Leu Val Thr Glu Glu His Gly Ser
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Ala Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95
```

```
Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Lys
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Leu Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Arg Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
```

```
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Asn Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Gly
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Ile Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asn Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Tyr Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 75
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 75
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Phe Leu Leu Phe Val Leu Leu Val Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Asp Ala Val His Tyr Gln Val Arg Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn

```
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Ala
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Ile Ile Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ile Ser
        355                 360                 365

Gly Glu Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Gly
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Arg Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Ile Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val His Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 76
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 76
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Gln Leu Pro Gln Lys Leu Asn
100 105 110

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Thr Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Arg Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

```
Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 77
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 77

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Thr Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Arg Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
```

```
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 78
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 78
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Gly Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Pro Gln Gly Gly Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Met Ile Pro
```

```
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Glu
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Ile Ser Val
            580                 585                 590


Glu Asn Leu Val His Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 79
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 79
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
```

```
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Gly Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Met Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Val Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Leu Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Glu
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Gln Phe Glu Ala Asp Ile Thr Asn Ser Thr Ile Ser Val
580 585 590

Glu Asn Leu Val His Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 80
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 80
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Leu Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His His Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Ser Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Lys Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Val Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Asp Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Leu Met Asp Gln Val Glu Lys Val Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asn Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Met Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Pro Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Ile Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Lys Phe Ser Cys Asp Arg Ser Lys Pro
        595                 600                 605


<210> 81
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 81
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125
```

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Gly Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Phe Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Gly Gly Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Met Ile Pro
                325                 330                 335
```

```
Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Val Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Glu
```

545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Ile Ser Val
580 585 590

Glu Asn Leu Val His Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 82
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 82
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Thr Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
```

```
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Arg Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560
```

```
Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 83
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 83
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
```

```
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Val Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Met Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Ser Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350
```

```
Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Phe
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Thr Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560
```

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 84
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 84
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

```
Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Glu Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Phe Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Phe Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Ser Leu
    290                 295                 300

Tyr His Asp Gly Ser Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350
```

```
Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Trp Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Val Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Val
545                 550                 555                 560
```

Ser Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Gln Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 85
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 85
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

```
Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Ile Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Val Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350
```

```
Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Asn
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ser Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
```

565 570 575

Gln Phe Tyr Gln Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 86
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 86
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

```
Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Val Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Ile Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Val Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
```

```
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Asn
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ser Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575
```

```
Gln Phe Tyr Gln Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 87
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 87
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140


Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
```

```
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Glu Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Ala Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Ala Pro Ala Leu Ala Ser
        355                 360                 365
```

```
Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Thr Phe Gly Arg
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Asn Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575
```

Gln Phe Tyr Gln Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 88
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 88
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145 150 155 160

```
Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Val Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Met Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Ser Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Phe
        355                 360                 365
```

```
Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Thr Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575
```

```
Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 89
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 89
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140


Lys Val Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160
```

```
Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Thr Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Ile Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Val Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365
```

```
Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Asn
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Gly Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Gly Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ser Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Gln Phe Glu Ala Asp Ile Ala Asn Ser Thr Thr Gly Val
```

```
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 90
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 90
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160
```

```
Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Ala Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Ser Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Val His Ile Thr Asn His Arg Gly
            340                 345                 350

Leu Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
```

```
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Ser Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Ser Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Arg Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Thr Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ser
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Lys Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590
```

```
Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 91
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 91
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140


Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160


Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
```

```
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Ala Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Ser Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Val His Ile Thr Asn His Arg Gly
            340                 345                 350

Leu Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380
```

```
Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Glu Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Ser Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Arg Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Thr Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ser
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Lys Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590
```

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 92
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 92
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145 150 155 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
165 170 175

```
Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Ala Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Ser Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Val His Ile Thr Asn His Arg Gly
            340                 345                 350

Leu Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380
```

```
Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Lys Pro Phe Gly Gly
385                 390                 395                 400


Glu Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415


Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
            420                 425                 430


Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Ser Leu Ser Asp Ser Gly
        435                 440                 445


Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460


Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Arg Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Thr Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ser
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Lys Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590
```

```
Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 93
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 93
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140


Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160


Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175
```

```
Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Ala Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Ser Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Leu Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380
```

```
Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Glu Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Ser Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Arg Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
```

595 600 605

<210> 94
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 94
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145 150 155 160

Lys Ser Ile Ala Ser Ala Val Asn Pro Ile Leu Leu Ser Ala Leu Ser
165 170 175

```
Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Ala Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Ser Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Leu Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
```

385 390 395 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
405 410 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
420 425 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
435 440 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
450 455 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465 470 475 480

Phe Ala Pro Arg Glu Ser Ser Arg Asn Cys Tyr Leu Pro Ile Gln Thr
485 490 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 95
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 95
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Ile Leu Leu Ile Leu Leu Val Gly
        35   40   45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr

```
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Ala Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Ser Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Val His Ile Thr Asn His Arg Gly
            340                 345                 350

Leu Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400
```

```
Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Ser Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Arg Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Thr Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ser
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Lys Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 96
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 96
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Lys
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

```
Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Asp Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400
```

```
Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 97
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 97
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Lys
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

```
Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Asp Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400
```

```
Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 98

<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 98
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Lys
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

```
Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Asp Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Gly Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
```

```
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605

<210> 99
<211> 607
```

<212> PRT
<213> Canine morbillivirus

<400> 99
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Lys
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Arg Arg Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser

```
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Arg Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Asp Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415
```

```
Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 100
<211> 607
<212> PRT

<213> Canine morbillivirus

<400> 100
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Asn Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Lys
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195   200   205

```
Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Asp Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ser Ser
                405                 410                 415
```

```
Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 101
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 101
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Lys
145   150   155   160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Phe Leu Ala Leu Ser
                165   170   175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

Thr Ser Met Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195   200   205

```
Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Asp Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415
```

```
Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ser Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Thr Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Arg Pro
        595                 600                 605
```

<210> 102
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 102
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1   5   10   15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35   40   45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50   55   60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65   70   75   80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85   90   95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100   105   110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Ser
        115   120   125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130   135   140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145   150   155   160

Lys Ser Ile Ala Leu Ala Ala Lys Pro Ile Leu Leu Ser Ala Leu Ser
                165   170   175

Gly Gly Lys Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180   185   190

Thr Ser Ile Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195   200   205

```
Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Val Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Gly Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
```

420 425 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
435 440 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
450 455 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465 470 475 480

Phe Ala Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
485 490 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Lys Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 103
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 103

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                  10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Val Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Lys Phe Phe Asn Pro Ser
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Val Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Ser Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Lys Pro Ile Leu Ser Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Ile Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
```

```
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Gln Glu Glu Gln Lys Ile Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430
```

```
Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Phe Leu Asp Pro Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Ser Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Val Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Ser Phe Ile Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Ile Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Thr Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 104
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 104
```
Met Leu Ser His Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
```

```
1               5                   10                  15

Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Arg Gly Asp
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Asp Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220
```

```
Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Leu Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430
```

```
Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Lys Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Gly Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Ala
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 105
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 105

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15
```

```
Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Gln Gly Asp
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220
```

```
Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Arg Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Arg Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Ala Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile His Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430
```

```
Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 106
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 106

```
Met Leu Ser His Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15
```

```
Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Arg Gly Asp
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Asp Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220
```

```
Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Lys Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Leu Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
```

```
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 107
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 107
Met Leu Ser His Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15
```

```
Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Arg Gly Asp
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
```

```
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Leu Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445
```

```
Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Ile Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 108
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 108

```
Met Leu Ser His Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Arg Gly Asp
```

```
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu Tyr Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240
```

```
Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Leu Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr His Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445
```

```
Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Ile Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 109
<211> 607
<212> PRT
<213> Canine morbillivirus

```
<400> 109
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Gln Gly Asp
            20                  25                  30
```

```
Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240
```

```
Gly Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Leu Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Arg Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile His Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445
```

```
Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 110
<211> 607
<212> PRT
<213> Canine morbillivirus

```
<400> 110
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Ser Lys Leu Ser Leu Met Thr Glu Glu Gln Gly Asp
            20                  25                  30
```

```
Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ala Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240
```

```
Gly Glu Phe Asp Thr Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Ser His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Arg Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Arg Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Ala Leu Pro Ile Asp Pro Ser
                405                 410                 415

Ile His Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Asp Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
```

```
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Cys Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 111
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 111
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Arg Ala Asn Ser Pro Lys Leu Ser Leu Val Thr Glu Glu Gln Gly Gly
            20                  25                  30
```

```
Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
```

```
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Trp Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asn Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Val Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Ser Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Gly Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 112
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 112
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
```

```
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Glu Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asn Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Val Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Leu Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Val Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Gly Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 113
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 113
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45
```

```
Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asn Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Val Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Arg Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Tyr Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Phe Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val His Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 114
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 114
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45
```

```
Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Asn Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Gly
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255
```

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Val Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys His Ile
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
```

```
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Asp Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 115
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 115
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45
```

```
Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Ser Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
```

```
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Ser
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asn Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Val Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Glu Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp His Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


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


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 116
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 116
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
```

```
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Met Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Gly Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Ser Met Ser Gln Asn Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Gly Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Val Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Gly Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Ala Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510


Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525


Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 117
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 117
Met Leu Pro Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45


Ile Leu Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60
```

```
Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Ser Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Ile Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asn Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Val Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Cys Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Val Asn Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Glu Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Ser Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480
```

```
Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Asn Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 118
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 118

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
        35                  40                  45

Ile Leu Thr Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60
```

```
Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Ser Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Ile Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270
```

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asn Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Ile Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Val Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Gly Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Val Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Glu Ser Gly
        435                 440                 445

Trp Leu Thr Val Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro Tyr Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
```

```
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Asn Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asn Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 119
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 119
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
    50                  55                  60
```

```
Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Val Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
```

```
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Glu Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

```
Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Glu Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Ser Ser Thr Thr Ser Val
            580                 585                 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 120
<211> 607
<212> PRT
<213> Canine morbillivirus

```
<400> 120
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
    50                  55                  60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
```

```
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Lys Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
500 505 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Glu Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 121
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 121
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
50 55 60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65 70 75 80

```
Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Val Gly Val Lys
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Ile Leu Ser Ala Leu Ser
                165                 170                 175

Gly Ala Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Ser Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Glu Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Pro His Asp Ser Val Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu His Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495
```

```
Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Gly Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 122
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 122

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Ile Ala Val Gly
        275                 280                 285
```

```
Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
```

```
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 123
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 123
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
    50                  55                  60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65                  70                  75                  80
```

```
Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
```

```
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Lys Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Met Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 124
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 124
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
50 55 60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe

```
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Gly Tyr Val Val Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Glu Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 125
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 125
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
50 55 60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
85 90 95

```
Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510
```

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
515 520 525

Arg Glu Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 126
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 126
Met Leu Ser Tyr Gln Asp Glu Val Gly Ala Phe Tyr Met Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
50 55 60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
85 90 95

```
Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Gln Gln Lys Leu Asn
            100                 105                 110

Gly Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Ser Glu Phe Asp Phe Arg Asn Phe His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ile Leu Phe
                165                 170                 175

Gly Cys Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ile
            180                 185                 190

Thr Ser Val Gly Arg Val Ile Pro Leu Ser Val Ser Leu Ser Thr Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Leu Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Lys Glu Phe Asp Thr Arg Glu Ile Arg Val Phe Glu Ile Lys Phe Ile
                245                 250                 255

Glu Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Ile Thr Asn Tyr Met
            260                 265                 270

Ile Leu Gly Glu Asn Ser Glu Ala Lys Val Cys Thr Ile Ala Val Asp
        275                 280                 285

Gln Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300
```

```
Tyr Tyr Asp Ser Asn Gly Ser Arg Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Glu Ala Ser Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala Asn Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Tyr Ile Ile Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Leu Glu Gly Gln Glu Asn Cys Leu Glu Ser Ala Cys Arg Arg
    370                 375                 380

Glu Ser Tyr Pro Met Cys Lys Gln Thr Ser Cys Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Val Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Glu Arg
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Arg
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Glu Asp Gln Phe Thr Val Thr Ser His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Phe Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
```

515 520 525

Arg Arg Tyr His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
530 535 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Glu Pro
595 600 605

<210> 127
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 127
Met Leu Ser Tyr Gln Asp Glu Val Gly Ala Phe Tyr Met Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
50 55 60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
85 90 95

```
Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Gln Gln Lys Leu Tyr
            100                 105                 110

Gly Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Ser Glu Phe Asp Phe Arg Asn Phe His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Asn Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn His Ile Leu Leu Ser Ile Leu Phe
                165                 170                 175

Gly Cys Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Ile
            180                 185                 190

Thr Ser Val Gly Arg Val Ile Pro Leu Ser Val Ser Leu Ser Thr Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Leu Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Lys Glu Phe Asp Thr Arg Glu Ile Arg Val Phe Glu Ile Lys Phe Ile
                245                 250                 255

Glu Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Ile Thr Asn Tyr Met
            260                 265                 270

Ile Leu Gly Glu Asn Ser Glu Ala Lys Val Cys Thr Ile Ala Val Asp
        275                 280                 285

Gln Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr Tyr Asp Ser Asn Gly Ser Arg Asp Ser Ile Leu Val Val Thr Leu
```

```
305                 310                 315                 320

Gly Ile Phe Glu Ala Ser Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala Asn Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Tyr Ile Ile Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Arg Leu Glu Gly Gln Glu Asn Cys Leu Glu Ser Ala Cys Arg Arg
    370                 375                 380

Glu Ser Tyr Pro Met Cys Lys Gln Thr Ser Cys Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Val Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Glu Arg
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Arg
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Glu Asp Gln Phe Thr Val Thr Ser His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Phe Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

```
Arg Arg Tyr His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Glu Pro
        595                 600                 605
```

<210> 128
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 128

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Ala Gly Val Arg Phe Arg Gln Val Ser
    50                  55                  60

Thr Ser Asn Val Glu Phe Gly Arg Leu Leu Lys Asp Asp Leu Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Met Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
```

```
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ala Ile Gly Val Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Lys Thr Ser Glu Ile Ile Ser Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Arg Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asn Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Arg Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Val Ala Thr Trp Met Val Pro Ala Leu Val Ser
        355                 360                 365

Glu Gln Gln Glu Gly Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Val Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Ala Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Asn Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Ile Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Thr Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

```
Arg Glu Asn His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ser Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asp Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 129
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 129

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Ser Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Val Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

Val Leu Pro Glu Asn Ser Lys Ala Lys Val Cys Thr Val Ala Val Gly
        275                 280                 285

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Met His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Ile Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525
```

```
Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Ser Val Arg Met Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 130
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 130

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

Lys Ala Asn Ser Ser Lys Leu Ser Leu Val Thr Glu Glu Gln Gly Gly
            20                  25                  30

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Met Pro Asp Tyr Ile Asp
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Val Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Ala Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320
```

```
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Arg Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Ile Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
```

```
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ala Thr Thr Ser Val
            580                 585                 590

Glu Asn Ser Val Arg Met Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 131
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 131

```
Met Phe Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110
```

```
Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Arg Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Ser Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Val Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Val Val Ile Pro
```

```
                325                 330                 335

Val Ala His Ser Ser Val Glu Lys Met His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Ile Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Asp Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 132
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 132
Met Phe Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
```

```
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Ser Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Val Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Val Val Ile Pro
                325                 330                 335
```

```
Val Ala His Ser Ser Val Glu Lys Met His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Ile Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Asp Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 133
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 133
Met Phe Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ser Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Ser Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Ser Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Val Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Val Val Ile Pro
                325                 330                 335
```

```
Val Ala His Ser Ser Val Glu Lys Met His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Ile Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540
```

```
Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Asp Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 134
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 134
Met Phe Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125
```

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Asp Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Ile Gly Arg Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Ser Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Val Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335
```

```
Val Ala His Ser Ser Val Glu Lys Met His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Ile Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
```

545 550 555 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
565 570 575

Gln Phe Tyr Arg Phe Asp Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 135
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 135
Met Phe Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Met Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

```
Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Thr Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
145                 150                 155                 160

Lys Ser Ile Ala Ser Ala Ala Ser Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Lys Ser Glu Ile Ile Ser Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Leu
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    290                 295                 300

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Ile Leu Val Val Thr Leu
305                 310                 315                 320

Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
                325                 330                 335

Val Ala His Ser Ser Val Glu Lys Met His Ile Thr Asn His Arg Gly
```

```
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Val Leu Val Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Asn Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Ile Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Val Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Pro Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Ile Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560
```

```
Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Asp Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 136
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 136
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
```

```
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160

Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Glu Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350
```

```
Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Glu Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Pro Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr His Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Asp Val Tyr Asp Pro Ile Arg Lys
    530                 535                 540

Ile Tyr Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560
```

```
Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 137
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 137
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140
```

```
Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160

Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Ile Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350
```

```
Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560
```

```
Phe Leu Arg Ile Glu Cys Phe Val Trp Gly Asp Asp Leu Trp Cys His
                565                 570                 575


Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Lys Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 138
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 138
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Lys Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140
```

```
Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160

Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Glu Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asn Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350
```

```
Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Glu Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr His Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
```

565 570 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 139
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 139
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Thr
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
130 135 140

```
Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160

Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Ile Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
```

```
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr His Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575
```

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
580 585 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 140
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 140
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1 5 10 15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Ile Gly
35 40 45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
50 55 60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65 70 75 80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
85 90 95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
100 105 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
115 120 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn His Pro Ser
130 135 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys

```
145                 150                 155                 160

Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Glu Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Ile Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Ile Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365
```

```
Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Gly Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575
```

```
Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590


Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 141
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 141
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140


Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160
```

```
Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Lys Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Ile Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365
```

```
Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Gly Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575
```

```
Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605
```

<210> 142
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 142

```
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Val Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160
```

```
Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Lys Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Val Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Ile Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365
```

```
Glu Lys Gln Glu Glu Gln Gln Thr Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Tyr Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Cys Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
```

```
            580                 585                 590

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
        595                 600                 605


<210> 143
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 143
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15

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

Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45

Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60

Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80

Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Met Ile Gly Ile Lys
145                 150                 155                 160
```

```
Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ser Leu Ser
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Ser Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Ser Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Ser His Asp Asp Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
```

```
    370                 375                 380

Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Gly Arg Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Ile Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Arg Thr Gln Asn Phe Arg Tyr Val Ile Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asn Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590
```

```
Glu Asn Leu Val His Ile Arg Phe Ser Phe Asn Arg Ser Lys Pro
        595                 600                 605


<210> 144
<211> 607
<212> PRT
<213> Canine morbillivirus

<400> 144
Met Leu Ser Tyr Gln Asp Lys Val Gly Ala Phe Tyr Lys Asp Asn Ala
1               5                   10                  15


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


Arg Arg Pro Pro Tyr Leu Leu Phe Val Leu Leu Ile Leu Leu Val Gly
        35                  40                  45


Ile Leu Ala Leu Leu Ala Ile Thr Gly Val Arg Phe His Gln Val Ser
    50                  55                  60


Thr Ser Asn Met Glu Phe Ser Arg Leu Leu Lys Glu Asp Met Glu Lys
65                  70                  75                  80


Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
                85                  90                  95


Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
            100                 105                 110


Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
        115                 120                 125


Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
    130                 135                 140


Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Ile Ile Gly Ile Lys
145                 150                 155                 160


Glu Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
```

```
                165                 170                 175

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Thr
            180                 185                 190

Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        195                 200                 205

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    210                 215                 220

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Tyr Ile Glu
225                 230                 235                 240

Glu Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
                245                 250                 255

Lys Arg Trp Leu Asn Asn Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            260                 265                 270

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

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Val Leu
    290                 295                 300

Tyr His Asp Ser Ser Gly Pro Gln Asp Ser Ile Leu Val Val Thr Leu
305                 310                 315                 320

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

Val Ala His Pro Ser Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            340                 345                 350

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Ala Ser
        355                 360                 365

Glu Lys Gln Glu Glu Gln Gln Asn Cys Leu Glu Ser Ala Cys Gln Arg
    370                 375                 380
```

```
Lys Thr Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
385                 390                 395                 400

Arg Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Ser Leu Asp Pro Ser
                405                 410                 415

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Val Ile Leu
            420                 425                 430

Asn Gly Gly Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        435                 440                 445

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    450                 455                 460

Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
465                 470                 475                 480

Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                485                 490                 495

Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            500                 505                 510

Leu Leu Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Val Ser
        515                 520                 525

Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    530                 535                 540

Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
545                 550                 555                 560

Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                565                 570                 575

Gln Phe Tyr Arg Phe Glu Ala Asp Val Thr Asn Ser Thr Thr Ser Val
            580                 585                 590
```

Glu Asn Leu Val Arg Ile Arg Phe Ser Cys Asn Arg Ser Lys Pro
595 600 605

<210> 145
<211> 527
<212> PRT
<213> Canine morbillivirus

<400> 145
Ser Glu Ala Val His His Gln Val Ile Asp Val Leu Thr Pro Leu Phe
1 5 10 15

Lys Ile Ile Gly Asp Glu Ile Gly Leu Arg Leu Pro Gln Lys Leu Asn
20 25 30

Glu Ile Lys Gln Phe Ile Leu Gln Lys Thr Asn Phe Phe Asn Pro Asn
35 40 45

Arg Glu Phe Asp Phe Arg Asp Leu His Trp Cys Ile Asn Pro Pro Ser
50 55 60

Lys Ile Lys Val Asn Phe Thr Asn Tyr Cys Asp Thr Ile Gly Ile Arg
65 70 75 80

Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
85 90 95

Gly Gly Arg Gly Asp Ile Phe Pro Pro Tyr Arg Cys Asn Gly Ala Thr
100 105 110

Ile Ser Val Gly Lys Ile Phe Pro Leu Ser Val Ser Leu Ser Met Ser
115 120 125

Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
130 135 140

Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Met Pro Asp Tyr Ile Glu
145 150 155 160

Gly Glu Phe Asp Thr Gln Lys Ile Arg Val Phe Glu Ile Gly Phe Ile
165 170 175

```
Lys Arg Trp Leu Asn Asp Met Pro Leu Leu Gln Thr Thr Asn Tyr Met
            180                 185                 190

Val Leu Pro Glu Asn Ser Arg Ala Lys Val Cys Thr Ile Ala Val Gly
        195                 200                 205

Glu Leu Thr Leu Ala Ser Leu Cys Val Asp Glu Ser Thr Val Leu Leu
    210                 215                 220

Tyr His Asp Ser Asn Gly Ser Gln Asp Gly Val Leu Val Val Thr Leu
225                 230                 235                 240

Gly Ile Phe Gly Ala Thr Ser Met Asp Gln Val Glu Glu Val Ile Pro
                245                 250                 255

Val Ala Asp Pro Leu Val Glu Lys Ile His Ile Thr Asn His Arg Gly
            260                 265                 270

Ile Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        275                 280                 285

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    290                 295                 300

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
305                 310                 315                 320

Gly Gln Leu Pro Ser Tyr Gly Arg Leu Thr Leu Pro Leu Asp Pro Ser
                325                 330                 335

Ile Asp Leu Gln Leu Asn Ile Ser Phe Thr Tyr Gly Pro Ile Ile Leu
            340                 345                 350

Asn Gly Asp Gly Met Asp Tyr Tyr Glu Ser Pro Leu Leu Asp Ser Gly
        355                 360                 365

Trp Leu Thr Ile Pro Pro Lys Asn Gly Thr Val Leu Gly Leu Ile Asn
    370                 375                 380
```

```
Lys Ala Ser Arg Gly Asp Gln Phe Thr Val Ile Pro His Val Leu Thr
385                 390                 395                 400


Phe Ala Pro Arg Glu Ser Ser Gly Asn Cys Tyr Leu Pro Ile Gln Thr
                405                 410                 415


Ser Gln Ile Met Asp Lys Asp Val Leu Thr Glu Ser Asn Leu Val Val
            420                 425                 430


Leu Ser Thr Gln Asn Phe Arg Tyr Val Val Ala Thr Tyr Asp Ile Ser
        435                 440                 445


Arg Asp Asp His Ala Ile Val Tyr Tyr Val Tyr Asp Pro Ile Arg Thr
    450                 455                 460


Ile Ser Tyr Thr Tyr Pro Phe Arg Leu Thr Thr Lys Gly Arg Pro Asp
465                 470                 475                 480


Phe Leu Arg Ile Glu Cys Phe Val Trp Asp Asp Asp Leu Trp Cys His
                485                 490                 495


Gln Phe Tyr Arg Phe Glu Ala Asp Ile Thr Asn Ser Thr Thr Ser Val
            500                 505                 510


Glu Asn Leu Val Arg Met Arg Phe Ser Cys Asn Arg Ser Lys Pro
        515                 520                 525


<210> 146
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 146
Met His Lys Gly Ile Pro Lys Ser Ser Lys Pro Gln Thr His Thr Gln
1               5                   10                  15


Gln Asp Arg Pro Pro Gln Pro Ser Thr Glu Pro Glu Glu Thr Arg Thr
            20                  25                  30


Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Ser
        35                  40                  45
```

```
Asp Pro Arg Thr Ser Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Ile
    50                  55                  60

Arg Ser Arg Lys Gln Thr Ser His Arg Leu Lys Asn Ile Pro Val His
65                  70                  75                  80

Gly Asn His Glu Ala Ile Ile Gln His Met Pro Glu Ser Val Ser Lys
                85                  90                  95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Val Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255
```

```
Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Arg Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Lys Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460
```

```
Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Gly Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 147

<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 147
Met His Lys Gly Ile Pro Lys Ser Ser Lys Pro Gln Thr His Thr Gln
1   5   10   15

Gln Asp Arg Pro Pro Gln Pro Ser Thr Glu Pro Glu Glu Thr Arg Thr
            20   25   30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Ser
        35   40   45

Asp Pro Arg Thr Ser Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Ile
    50   55   60

Arg Ser Arg Lys Gln Thr Ser His Arg Leu Lys Asn Ile Pro Val His
65   70   75   80

Gly Asn His Glu Ala Ile Ile Gln His Met Pro Glu Ser Val Ser Lys
                85   90   95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

```
Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Val Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Arg Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
```

```
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Lys Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Gly Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620
```

```
Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640


Thr Lys Val Asp Pro Ala Phe Lys Arg Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 148
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 148
Met His Arg Gly Ile Pro Lys Ser Ser Lys Thr Gln Thr His Thr Gln
1               5                   10                  15


Gln Asp Arg Pro Pro Gln Pro Ser Thr Glu Leu Glu Glu Thr Arg Thr
            20                  25                  30


Ser Arg Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45


Asp Pro Arg Thr Ser Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
    50                  55                  60


Arg Ser Arg Lys Gln Thr Ser His Arg Leu Lys Asn Ile Pro Val His
65                  70                  75                  80


Gly Asn His Glu Ala Thr Ile Gln His Ile Pro Glu Ser Val Ser Lys
                85                  90                  95


Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100                 105                 110


Gly Ser His Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Met Ala Ser
        115                 120                 125


Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
```

```
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Glu Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Val Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Arg Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ile Tyr Ala Leu Gly Gly
            340                 345                 350
```

```
Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Ser Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Ala Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Gly Lys Val Ala Leu
545                 550                 555                 560
```

Gly Pro Ala Ile Ser Leu Asp Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625 630 635 640

Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 149
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 149
Met His Lys Gly Ile Pro Lys Ser Ser Lys Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Arg Pro Pro Gln Pro Ser Thr Glu Leu Glu Glu Thr Arg Thr
20 25 30

Ser Arg Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Thr His Tyr
35 40 45

Asp Pro Arg Thr Ser Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
50 55 60

Arg Ser Arg Lys Gln Thr Ser His Arg Leu Lys Asn Ile Pro Val His
65 70 75 80

```
Gly Asn His Glu Ala Thr Ile Gln His Ile Pro Glu Ser Val Ser Lys
                85                  90                  95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Met Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Glu Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Val Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285
```

```
Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Arg Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ile Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Ser Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495
```

```
Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Ala Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Gly Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Asp Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 150
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 150

```
Met His Lys Gly Ile Pro Lys Ser Ser Lys Thr Gln Thr His Thr Gln
1               5                   10                  15
```

```
Gln Asp Arg Pro Pro Gln Pro Ser Thr Glu Leu Glu Glu Thr Arg Thr
            20                  25                  30

Ser Arg Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45

Asp Pro Arg Thr Ser Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
    50                  55                  60

Arg Ser Arg Lys Gln Thr Ser His Arg Leu Lys Asn Ile Pro Val His
65                  70                  75                  80

Gly Asn His Glu Ala Thr Ile Gln His Ile Pro Glu Ser Val Ser Lys
                85                  90                  95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Met Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Glu Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220
```

```
Phe Ala Gly Val Val Leu Ala Gly Val Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240


Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255


Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270


Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285


Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300


Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Arg Leu Leu Arg
305                 310                 315                 320


Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335


Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ile Tyr Ala Leu Gly Gly
            340                 345                 350


Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Ser Asp Met
        355                 360                 365


Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380


Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400


Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415


Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430


Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
```

```
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asn Gly Ala Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Gly Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Asp Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Ile Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655
```

Ser Tyr Val Arg Ser Leu
            660

<210> 151
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 151
Met His Lys Ala Ile Pro Lys Ser Ser Lys Thr His Thr His Thr Gln
1   5   10   15

Gln Asn Arg Pro Ser Gln Pro Ser Thr Gly Pro Asp Glu Thr Arg Thr
            20   25   30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35   40   45

Asp Pro Arg Thr Leu Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
    50   55   60

Arg Ser Arg Lys Gln Thr Ser Tyr Arg Leu Glu Asn Ile Ser Val His
65   70   75   80

Gly Asn His Glu Ala Ile Ile Gln His Met Pro Glu Ser Val Ser Lys
                85   90   95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Arg Pro Asn Ala Ile Asn Ser
            100   105   110

Gly Ser Gln Cys Ser Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Ala Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu

```
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Val Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Ala Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Ile Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590
```

```
Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Pro Ile Leu Ser Gly Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 152
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 152
Met His Lys Glu Ile Pro Lys Ser Ser Lys Thr His Thr His Thr Gln
1               5                   10                  15


Gln Asn Arg Pro Pro Gln Pro Ser Thr Gly Pro Asp Glu Thr Arg Thr
            20                  25                  30


Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr Asn Tyr
        35                  40                  45


Asp Pro Arg Thr Leu Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
    50                  55                  60


Arg Ser Arg Lys Gln Thr Ser Tyr Arg Leu Glu Asn Ile Ser Val His
65                  70                  75                  80


Gly Asn His Glu Ala Ile Ile Gln His Met Pro Glu Ser Val Ser Lys
                85                  90                  95


Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100                 105                 110
```

```
Gly Ser Gln Cys Ser Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Ala Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Ala Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320
```

```
Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525
```

```
Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Gly Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 153
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 153
Met His Lys Glu Ile Pro Lys Ser Ser Lys Thr His Thr His Thr Gln
1               5                   10                  15

Gln Asn Arg Pro Pro Gln Pro Ser Thr Gly Pro Asp Glu Thr Arg Thr
            20                  25                  30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr Asn Tyr
        35                  40                  45
```

```
Asp Pro Arg Thr Leu Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
    50                  55                  60

Arg Ser Arg Lys Gln Thr Ser Tyr Arg Leu Glu Asn Ile Ser Val His
65                  70                  75                  80

Gly Asn His Glu Ala Ile Ile Gln His Met Pro Glu Ser Val Ser Lys
                85                  90                  95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100                 105                 110

Gly Ser Gln Cys Ser Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Ala Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Ala Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255
```

```
Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
```

```
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Gly Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 154
<211> 662

<212> PRT
<213> Canine morbillivirus

<400> 154
Met His Lys Glu Ile Pro Lys Ser Ser Lys Thr His Thr His Thr Gln
1   5   10   15

Gln Asn Arg Pro Pro Gln Pro Ser Thr Gly Pro Asp Glu Thr Arg Thr
            20   25   30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr Asn Tyr
        35   40   45

Asp Pro Arg Thr Leu Asp Arg Pro Val Ser Tyr Thr Met Asn Arg Thr
    50   55   60

Arg Ser Arg Lys Gln Thr Ser Tyr Arg Leu Glu Asn Ile Ser Val His
65   70   75   80

Gly Asn His Glu Ala Ile Ile Gln His Met Pro Glu Ser Val Ser Lys
                85   90   95

Gly Ala Arg Ser Gln Ile Glu Arg Arg Gln Pro Asn Ala Ile Asn Ser
            100   105   110

Gly Ser Gln Cys Ser Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Ala Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys

```
        195                 200                 205

Asn Val Lys Pro Leu Glu Ser Leu Gly Ser Ala Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415
```

```
Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Gly Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620
```

```
Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 155
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 155
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Ser Thr Pro Thr Gln
1               5                   10                  15


Gln Asp Pro Pro Pro Gln His Ser Ile Lys Ser Ala Gly Ala Lys Val
            20                  25                  30


Ser Gln Ala Arg His Asn Thr Thr Ser Ala His Gln Ser Thr Arg His
        35                  40                  45


Gly Pro Arg Ile Ser Asp Arg Pro Thr His Tyr Ile Met Asn Arg Thr
    50                  55                  60


Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80


Gly Asp His Glu Cys Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95


Gly Val Arg Ser Arg Phe Lys Arg Arg Gln Ser Asn Ala Thr Ser Ser
            100                 105                 110


Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125


Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140
```

```
Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Ala Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350
```

```
Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Met Ile Ser Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560
```

```
Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575


Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590


Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Leu Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Phe
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 156
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 156
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Ser Thr Pro Thr Gln
1               5                   10                  15


Pro Glu Pro Pro Pro Gln His Ser Ile Lys Ser Ala Gly Ala Lys Val
            20                  25                  30


Ser Gln Ala Arg His Asn Thr Thr Ser Ala His Gln Ser Thr Arg His
        35                  40                  45


Gly Pro Arg Ile Ser Asp Arg Pro Thr His Tyr Ile Met Asn Arg Thr
    50                  55                  60


Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80
```

```
Gly Asp His Glu Cys Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Val Arg Ser Arg Phe Lys Arg Arg Gln Ser Asn Ala Thr Ser Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Arg Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Ala Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285
```

```
Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
```

```
            500                 505                 510

Ser Thr Met Ile Ser Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Leu Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Phe
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 157
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 157
Met His Asn Lys Thr Pro Lys Gly Ser Lys Thr Pro Thr Pro Thr Gln
1               5                   10                  15
```

```
Gln Asp Pro Pro Pro Gln His Ser Ile Lys Ser Ala Gly Ala Lys Ala
            20                  25                  30

Ser Gln Ala Arg His Asn Thr Thr Ser Ala His Gln Ser Thr Arg His
        35                  40                  45

Gly Pro Arg Ile Ser Asp Arg Pro Thr His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Cys Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Cys Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Val Arg Ser Arg Phe Lys Arg Arg Gln Ser Asn Ala Thr Ser Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
```

```
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Ala Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445
```

```
Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Met Ile Ser Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Leu Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Phe
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655
```

Ser Tyr Val Arg Ser Leu
660

<210> 158
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 158
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Pro Thr Pro Thr Gln
1 5 10 15

Gln Asp Pro Pro Pro Gln His Ser Ile Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Ala Arg Tyr Asn Ile Thr Ser Ala Gln Gln Ser Thr Arg His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
85 90 95

Gly Val Arg Ser Arg Phe Lys Arg Arg Gln Ser Asn Ala Thr Ser Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Ile Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590
```

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Phe
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 159
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 159
Met His Asn Lys Ile Pro Lys Gly Ser Lys Ile Pro Thr Pro Thr Gln
1 5 10 15

Gln Asp Pro Ser Pro Gln His Ser Ile Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Ala Arg His Asn Thr Thr Ser Ala Gln Arg Pro Thr Arg His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Pro Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Glu Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
85 90 95

Gly Val Arg Ser Arg Phe Lys Arg Arg Gln Ser Asn Ala Thr Ile Ser
100 105 110

```
Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Ser Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320
```

```
Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Ile Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
```

```
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Val Leu Leu Phe
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Arg Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 160
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 160
Met His Asn Lys Ile Pro Lys Gly Ser Lys Ile Leu Thr Pro Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Gln Arg His Asn Ile Lys Ser Ala Glu Thr Arg Thr
            20                  25                  30

Ser Pro Ala Arg His Ser Ile Thr Ser Ala Arg Arg Ser Thr Arg His
        35                  40                  45
```

```
Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Ile Val His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Met Arg Ser Arg Phe Lys Arg Arg Gln Ser Ser Ala Thr Ser Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
```

```
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile Gln Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480
```

```
Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Val Leu Leu Phe
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 161
<211> 662
<212> PRT

<213> Canine morbillivirus

<400> 161
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Leu Thr Thr Thr Gln
1   5   10   15

Gln Asp Phe Pro Gln Arg His Ser Ile Lys Ser Ala Glu Thr Gln Thr
            20   25   30

Ser Gln Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Ala Arg His
        35   40   45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50   55   60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65   70   75   80

Lys Asp His Glu Gly Ile Ile His His Thr Pro Glu Arg Val Ser Gln
                85   90   95

Gly Met Arg Phe Arg Phe Lys Arg Arg Gln Ser Ser Ala Thr Ser Ser
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195   200   205

```
Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415
```

```
Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Ile Ala Leu Val Leu Leu Phe
    610                 615                 620
```

```
Leu Ile Cys Cys Cys Lys Arg Arg Tyr Leu Gln Thr Leu Lys Gln His
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 162
<211> 661
<212> PRT
<213> Canine morbillivirus

<400> 162
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Leu Thr Thr Thr Gln
1               5                   10                  15


Gln Asp Phe Pro Gln Arg His Ser Ile Lys Ser Ala Glu Thr Gln Thr
            20                  25                  30


Ser Gln Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Ala Arg His
        35                  40                  45


Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60


Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80


Lys Asp His Glu Gly Ile Ile His His Thr Pro Glu Arg Val Ser Gln
                85                  90                  95


Gly Met Arg Phe Arg Phe Lys Arg Arg Gln Ser Ser Ala Thr Ser Ser
            100                 105                 110


Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125


Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140
```

```
Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Lys Leu Met Pro Asn Val Ser Leu Ile
                165                 170                 175

Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu Ser
            180                 185                 190

Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys Asn
        195                 200                 205

Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg Phe
    210                 215                 220

Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala Ala
225                 230                 235                 240

Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala Gln
                245                 250                 255

Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala Ile
            260                 265                 270

Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln Gly
        275                 280                 285

Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His Met
    290                 295                 300

Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg Tyr
305                 310                 315                 320

Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro Ile
                325                 330                 335

Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly Glu
            340                 345                 350
```

```
Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met Ile
        355                 360                 365

Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val Asp
    370                 375                 380

Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu Ser
385                 390                 395                 400

Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr Asn
                405                 410                 415

Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala Thr
            420                 425                 430

Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe Val
        435                 440                 445

Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser Pro
    450                 455                 460

Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg Thr
465                 470                 475                 480

Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly Asn
                485                 490                 495

Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr Gly
            500                 505                 510

Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala Ser
        515                 520                 525

Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val Gly
    530                 535                 540

Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu Gly
545                 550                 555                 560

Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly Asn
```

565 570 575

Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser Asn
580 585 590

Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser Leu
595 600 605

Leu Ser Val Pro Ile Leu Ile Cys Ile Ala Leu Val Leu Leu Phe Leu
610 615 620

Ile Cys Cys Cys Lys Arg Arg Tyr Leu Gln Thr Leu Lys Gln His Thr
625 630 635 640

Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys Ser
645 650 655

Tyr Val Arg Ser Leu
660

<210> 163
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 163
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Leu Thr Thr Thr Gln
1 5 10 15

Gln Asp Phe Pro Lys Arg His Ser Ile Lys Ser Ala Glu Thr Gln Thr
20 25 30

Ser Gln Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr Arg His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

```
Gly Asp His Glu Gly Ile Ile His His Thr Pro Glu Arg Val Ser Gln
                85                  90                  95

Gly Met Arg Phe Arg Phe Lys Arg Arg Gln Ser Ser Ala Thr Ser Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser Asn Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Thr Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Ile Pro Ala Met Gln His
```

```
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510
```

```
Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Val Leu Leu Phe
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Leu Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 164
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 164

```
Met His Asn Lys Ile Pro Lys Gly Ser Lys Thr Leu Thr Pro Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Gln Arg His Ser Ile Lys Ser Ala Glu Thr Gln Thr
```

```
            20                  25                  30

Ser Gln Ala Arg His Ser Ile Thr Ser Ala His Arg Ser Ala Arg His
        35                  40                  45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Pro Cys Lys Gln Ala Gly Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Ile Ile His His Thr Pro Glu Arg Val Ser Gln
                85                  90                  95

Gly Met Arg Ser Arg Phe Lys Arg Arg Gln Ser Ser Ala Thr Ser Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser Arg Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240
```

```
Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln Gln
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445
```

```
Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Ile Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Val Leu Leu Phe
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln His
625                 630                 635                 640

Thr Lys Ile Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655
```

Ser Tyr Val Arg Ser Leu
660

<210> 165
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 165
Met His Asn Lys Ile Pro Lys Arg Ser Lys Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Pro Gln His Ser Thr Glu Leu Ala Glu Thr Lys Thr
20 25 30

Ser Arg Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Thr His Tyr
35 40 45

Gly Pro Leu Thr Ser Asp Arg Pro Ile His Tyr Thr Met Asn Arg Ile
50 55 60

Arg Ser Arg Lys Gln Ala Ser His Arg Ser Glu Asn Ile Pro Val His
65 70 75 80

Gly Asn His Glu Gly Thr Ile His His Thr Pro Gly Ser Val Ser Gln
85 90 95

Gly Ala Gly Ser Arg Leu Lys Arg Arg Gln Ser Asn Ala Ile Asn Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Leu Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Ala Arg
145 150 155 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Glu Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Ala Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Val Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Ile Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Pro Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Ser Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
```

595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Phe
610 615 620

Met Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Ala Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 166
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 166
Met His Asn Lys Ile Pro Lys Arg Ser Asn Thr Arg Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Pro Gln Pro Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Ala Arg His Ser Ile Thr Ser Ala Arg Arg Ser Thr His His
35 40 45

Asp Pro Leu Thr Ser Asp Arg Pro Ile His Tyr Ile Met Asn Arg Ile
50 55 60

Arg Ser Cys Lys Gln Thr Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Ile Ile His His Thr Pro Gly Ser Val Pro Gln
85 90 95

Gly Ser Gly Ser Gln Ile Lys Arg Arg Gln Ser Asn Ala Ile Asn Ser
100 105 110

```
Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Ala Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Glu Asn Cys Thr Lys Ala Lys Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
```

```
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Ser Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Pro Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540
```

```
Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560


Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575


Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590


Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640


Ala Lys Val Asp Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 167
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 167
Met His Asn Lys Ile Pro Lys Arg Ser Asn Thr Arg Lys His Thr Gln
1               5                   10                  15


Gln Asp Leu Pro Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
            20                  25                  30


Ser Gln Ala Arg His Ser Thr Thr Ser Ala Arg Arg Ser Thr His His
        35                  40                  45


Gly Pro Leu Thr Ser Asp Arg Pro Ile His Tyr Ile Met Asn Arg Ile
```

```
    50                  55                  60

Arg Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Thr Ile His His Thr Pro Gly Ser Val Ser Gln
                85                  90                  95

Gly Ala Gly Ser Arg Leu Lys Arg Arg Gln Ser Asn Ala Thr Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270
```

```
Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Val Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Pro Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480
```

```
Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Ala Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 168
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 168
Met His Asn Lys Ile Pro Lys Arg Ser Asn Thr Arg Lys His Thr Gln
1   5   10   15

Gln Asp Leu Pro Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
            20   25   30

Ser Gln Ala Arg His Ser Thr Thr Ser Ala Arg Arg Ser Thr His His
        35   40   45

Gly Pro Leu Thr Ser Asp Arg Pro Ile His Tyr Ile Met Asn Arg Ile
    50   55   60

Arg Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Ala His
65   70   75   80

Gly Asp His Glu Gly Thr Ile His His Thr Pro Gly Ser Val Ser Gln
                85   90   95

Gly Ala Gly Ser Arg Leu Lys Arg Arg Gln Ser Asn Ala Thr Asn Ser
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195   200   205

```
Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Val Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415
```

```
Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Pro Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
```

625 630 635 640

Ala Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 169
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 169
Met His Asn Lys Ile Pro Lys Arg Ser Asn Thr Arg Lys His Thr Gln
1 5 10 15

Gln Asp Leu Pro Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Ala Arg His Ser Thr Thr Ser Ala Arg Arg Ser Thr His His
35 40 45

Gly Pro Leu Thr Ser Asp Arg Pro Ile His Tyr Ile Met Asn Arg Ile
50 55 60

Arg Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Thr Ile His His Thr Pro Gly Ser Val Ser Gln
85 90 95

Gly Ala Gly Ser Arg Leu Lys Arg Arg Gln Ser Asn Ala Thr Asn Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

```
Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160


Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175


Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190


Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205


Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220


Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240


Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255


Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270


Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285


Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300


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


Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335


Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350


Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
```

```
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Pro Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575
```

```
Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Ala Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 170
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 170

```
Met His Asn Lys Ile Pro Lys Arg Ser Asn Thr Arg Lys His Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
            20                  25                  30

Ser Gln Ala Arg His Ser Thr Thr Ser Ala Arg Arg Ser Thr His His
        35                  40                  45

Gly Pro Leu Thr Ser Asp Arg Pro Ile His Tyr Ile Met Asn Arg Ile
    50                  55                  60

Arg Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Thr Ile His His Thr Pro Gly Ser Val Ser Gln
```

```
                85                  90                  95

Gly Ala Gly Ser Arg Leu Lys Arg Arg Gln Ser Asn Ala Thr Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300
```

```
Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Ala Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510
```

```
Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Ala Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Lys Ser Leu
            660


<210> 171
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 171
Met His Asn Lys Ile Pro Lys Arg Ser Lys Thr Arg Lys His Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
            20                  25                  30
```

```
Ser Gln Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Ala His His
        35                  40                  45

Gly Ser Leu Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Val
    50                  55                  60

Arg Ser Cys Lys Gln Ala Gly His Lys Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Thr Ile His His Thr Pro Gly Ser Val Ser Gln
                85                  90                  95

Gly Ala Gly Ser Arg Leu Lys Arg Arg Gln Ser Asn Ala Thr Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Thr Thr Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Ser Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240
```

```
Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Ser Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Pro Cys Val Phe
        435                 440                 445
```

```
Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Ile Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

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

Leu Leu Ser Val Pro Leu Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
```

660

<210> 172
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 172
Met His Asn Lys Ile Pro Lys Arg Ser Arg Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Thr Arg His Ser Ile Thr Pro Ala Gln Arg Ser Thr His His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
85 90 95

Gly Ala Arg Ser Arg Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
```

385 390 395 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
405 410 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
420 425 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
435 440 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
450 455 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465 470 475 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
485 490 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
500 505 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
515 520 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Ile Thr Val Gln Val
530 535 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545 550 555 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn His Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 173
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 173
Met His Asn Lys Ile Pro Glu Arg Ser Arg Ile Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Gln Gln Tyr Ser Thr Lys Ser Val Glu Thr Glu Thr
20 25 30

Ser Gln Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Met His His
35 40 45

Gly Pro Leu Thr Leu Glu Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Arg Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Ile Ile His His Lys Pro Glu Ser Val Ser Gln
85 90 95

Gly Thr Arg Ser Gln Phe Lys Arg Arg Arg Ser Asp Ala Thr Asn Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser

```
        115                 120                 125

Leu Phe Ile Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ser Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335
```

```
Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540
```

```
Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560


Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575


Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ala Leu Ile Glu Ser Ser
            580                 585                 590


Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Leu Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 174
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 174
Met His Asn Lys Ile Pro Glu Arg Ser Arg Ile Gln Thr His Thr Gln
1               5                   10                  15


Gln Asp Leu Pro Gln Gln Tyr Ser Thr Lys Ser Val Glu Thr Glu Thr
            20                  25                  30


Ser Gln Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Met His His
        35                  40                  45


Gly Pro Leu Thr Leu Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60
```

```
Arg Ser Arg Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Ile Ile His His Lys Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Thr Arg Ser Gln Phe Lys Arg Arg Arg Ser Asp Ala Thr Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Ile Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ser Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270
```

```
Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Gln Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480
```

```
Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ala Leu Ile Glu Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Leu Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 175
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 175
Met His Asn Lys Ile Pro Glu Arg Ser Arg Ile Gln Thr His Thr Gln
1   5   10   15

Gln Asp Leu Pro Gln Gln Tyr Ser Thr Lys Ser Val Glu Thr Glu Thr
            20   25   30

Ser Gln Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Met His His
        35   40   45

Gly Pro Leu Thr Leu Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50   55   60

Arg Ser Arg Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65   70   75   80

Gly Asp His Glu Gly Ile Ile His His Lys Pro Glu Ser Val Ser Gln
                85   90   95

Gly Thr Arg Ser Gln Phe Lys Arg Arg Arg Ser Asp Ala Thr Asn Ser
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Ile Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ser Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195   200   205

```
Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Gln Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
```

```
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ala Leu Ile Glu Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Leu Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640
```

```
Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 176
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 176
Met His Asn Lys Ile Pro Glu Arg Ser Arg Ile Gln Thr His Thr Gln
1               5                   10                  15


Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Val Glu Thr Asp Thr
            20                  25                  30


Ser Gln Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Met His His
        35                  40                  45


Gly Pro Leu Thr Leu Asp Arg Pro Val His Tyr Ile Met Ser Arg Thr
    50                  55                  60


Arg Ser Arg Lys Gln Ala Ser Asp Arg Ser His Asn Ile Pro Ala His
65                  70                  75                  80


Gly Asp His Lys Gly Ile Ile His His Lys Pro Glu Ser Val Ser Gln
                85                  90                  95


Gly Ala Gly Ser Gln Phe Lys Lys Arg Arg Tyr Asp Thr Thr Asn Ser
            100                 105                 110


Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125


Leu Phe Ile Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140


Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
```

```
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ser Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Ile Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365
```

```
Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575
```

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Glu Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Pro Ser Leu Ser Phe Ser Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Leu Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 177
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 177
Met His Asn Lys Ile Pro Glu Arg Ser Arg Ile Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Val Glu Thr Asp Thr
20 25 30

Ser Gln Ala Arg His Ser Thr Thr Ser Ala Gln Arg Ser Met His His
35 40 45

Gly Pro Leu Thr Leu Asp Arg Pro Val His Tyr Ile Met Ser Arg Thr
50 55 60

Arg Ser Arg Lys Gln Ala Ser Tyr Arg Ser His Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Lys Gly Ile Ile His His Lys Pro Glu Ser Val Ser Gln
85 90 95

```
Gly Ala Gly Ser Gln Phe Lys Lys Arg Arg Tyr Asp Thr Thr Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Ile Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ser Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300
```

```
Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510
```

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
515 520 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
530 535 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545 550 555 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Glu Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Pro Ser Leu Ser Phe Ser Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Leu Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 178
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 178
Met His Glu Lys Ile Pro Lys Arg Ser Lys Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Ala Glu Ser Lys Thr
20 25 30

```
Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45

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

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Asp Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Ala Lys Ser Arg Leu Lys Met Gly Gln Ser Asn Ala Val Lys Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Asp Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Ile Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240
```

```
Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Val Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
```

```
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr His Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Arg
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 179
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 179
Met His Glu Lys Ile Pro Lys Arg Ser Lys Thr Gln Thr His Thr Gln
1   5   10   15

Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Ala Glu Ser Lys Thr
            20   25   30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35   40   45

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

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65   70   75   80

Gly Asp His Asp Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85   90   95

Gly Ala Lys Ser Arg Leu Lys Met Gly Gln Ser Asn Ala Val Lys Ser
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Asp Glu Tyr Glu Lys Leu Leu

```
            180                 185                 190

Ser Ser Ile Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Val Ser Tyr Pro Thr Leu
385                 390                 395                 400
```

```
Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605
```

```
Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr His Lys Gln Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Arg
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 180
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 180
Met His Glu Lys Ile Pro Lys Arg Ser Lys Thr Gln Thr His Thr Gln
1               5                   10                  15


Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Ala Glu Ser Lys Thr
            20                  25                  30


Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45


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


Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80


Gly Asp His Asp Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95


Gly Ala Lys Ser Arg Leu Lys Met Gly Gln Ser Asn Ala Val Lys Ser
            100                 105                 110


Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125
```

```
Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Asp Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Ile Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335
```

```
Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Val Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540
```

```
Gly Ser Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr His Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Arg
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 181
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 181

```
Met His Glu Lys Ile Pro Lys Arg Ser Lys Thr Gln Thr His Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Ala Glu Ser Lys Thr
            20                  25                  30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45

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

```
Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Asp Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Ala Lys Ser Arg Leu Lys Met Gly Gln Ser Asn Ala Val Lys Ser
            100                 105                 110

Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Asp Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Ser Ser Ile Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270
```

```
Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Val Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
```

485 490 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
500 505 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
515 520 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
530 535 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545 550 555 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr His Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Ala Ser Arg
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 182
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 182

```
Met His Lys Lys Ile Pro Lys Arg Ser Lys Thr Gln Thr His Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Gln Gln His Ser Thr Lys Ser Ala Glu Ser Lys Thr
            20                  25                  30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45

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

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Asp Gly Ile Ile His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Ala Lys Ser Arg Leu Lys Met Gly Gln Ser Asn Ala Val Lys Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Val Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Asp Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
```

```
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Val Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430
```

```
Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640
```

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 183
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 183
Met His Lys Glu Ile Pro Glu Arg Ser Arg Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Gln Gln Lys Ser Thr Glu Tyr Thr Glu Ile Lys Thr
20 25 30

Ser Arg Ala Arg His Gly Ile Thr Pro Ala Gln Arg Ser Thr His Tyr
35 40 45

Gly Pro Arg Thr Leu Asp Arg Leu Val Cys Tyr Ile Met Asn Arg Ala
50 55 60

Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Val Val His His Thr Leu Glu Ser Val Ser Gln
85 90 95

Gly Ala Arg Ser Gln Leu Lys Arg Arg Pro Ser Asn Ala Ile Asn Ser
100 105 110

Gly Phe Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

```
Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Val Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365
```

```
Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Arg Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575
```

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Ala Val Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ala Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 184
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 184
Met His Lys Glu Ile Pro Glu Arg Ser Arg Thr Gln Thr His Thr Gln
1 5 10 15

Gln Asp Leu Pro Gln Gln Lys Ser Thr Glu Tyr Thr Glu Ile Lys Thr
20 25 30

Ser Arg Ala Arg His Gly Ile Thr Pro Ala Gln Arg Ser Thr His Tyr
35 40 45

Gly Pro Arg Thr Leu Asp Arg Leu Val Cys Tyr Ile Met Asn Arg Ala
50 55 60

Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Gly Val Val His His Thr Leu Glu Ser Val Ser Gln
85 90 95

```
Gly Ala Arg Ser Gln Leu Lys Arg Arg Pro Ser Asn Ala Ile Asn Ser
            100                 105                 110

Gly Phe Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Ile Gln His
    290                 295                 300
```

```
Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Arg Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
```

```
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Ala Val Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 185
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 185
Met His Lys Glu Ile Pro Glu Lys Ser Arg Thr Arg Thr His Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Gln Gln Lys Ser Thr Glu Tyr Thr Glu Ile Lys Thr
            20                  25                  30
```

```
Ser Arg Ala Arg His Gly Ile Thr Pro Ala Gln Arg Ser Thr His Tyr
        35                  40                  45

Gly Pro Arg Thr Leu Asp Arg Leu Val Cys Tyr Ile Met Asn Arg Ala
    50                  55                  60

Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Val Val His His Thr Pro Glu Ser Val Ser Gln
                85                  90                  95

Gly Ala Arg Ser Gln Leu Lys Arg Arg Thr Ser Asn Ala Ile Asn Ser
            100                 105                 110

Gly Phe Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
```

```
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Ile Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Thr Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Arg Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460
```

```
Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Ile Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Ala Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Arg Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 186
<211> 659
<212> PRT
<213> Canine morbillivirus

<400> 186
Met His Lys Lys Ile Pro Glu Arg Ser Arg Thr Tyr Thr His Thr Gln
1   5   10   15

Gln Asp Leu Pro Gln Gln Asp Asn Thr Lys Tyr Thr Glu Ile Lys Thr
            20   25   30

Ser Arg Ala Arg His Gly Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35   40   45

Gly Pro Arg Thr Leu Asp Arg Leu Val Tyr Tyr Ile Met Asn Arg Ser
    50   55   60

Met Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Leu Ala His
65   70   75   80

Gly Asp His Glu Gly Val Val His His Thr Pro Lys Ser Val Ser Gln
                85   90   95

Gly Ala Arg Ser Gln Leu Lys Arg Arg Gln Ser Asn Ala Ile Asn Ser
            100   105   110

Gly Phe Gln Tyr Val Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

```
Asn Ser Val Leu Glu Pro Thr Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Ser Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asp Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Arg Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400
```

```
Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Ile Ala Ser Asp Thr
        515                 520                 525

Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val Gly Gly Arg
    530                 535                 540

Gln Tyr Pro Asp Leu Val Tyr Glu Ser Lys Val Ala Leu Gly Pro Ala
545                 550                 555                 560

Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly Asn Ala Leu
                565                 570                 575

Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser Asn Gln Ile
            580                 585                 590

Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser Leu Leu Ser
        595                 600                 605
```

```
Val Pro Ile Leu Ser Cys Ala Val Leu Ala Leu Leu Leu Leu Ile Tyr
    610                 615                 620

Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn Thr Lys Val
625                 630                 635                 640

Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys Ser Tyr Val
                645                 650                 655

Arg Ser Leu
```

<210> 187
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 187

```
Met His Lys Lys Ile Pro Glu Arg Ser Lys Thr Gln Thr His Thr Gln
1               5                   10                  15

Gln Asp Leu Pro Arg Gln Tyr Ser Thr Lys Tyr Thr Glu Ile Lys Ile
            20                  25                  30

Ser Arg Ala Arg His Gly Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
        35                  40                  45

Gly Pro Arg Thr Ser Asp Arg Leu Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Ile Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Ala His
65                  70                  75                  80

Gly Asp His Glu Gly Val Val His His Thr Pro Glu Ser Val Pro Gln
                85                  90                  95

Gly Ser Gly Ser Gln Leu Lys Arg Arg Gln Ser Asn Ala Phe Asn Ser
            100                 105                 110

Gly Ser Gln Tyr Ile Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125
```

```
Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335
```

```
Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Arg Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
```

```
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Val Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 188
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 188

```
Met His Asn Lys Ile Pro Lys Arg Ser Arg Thr Arg Thr His Thr Arg
1               5                   10                  15

Gln Asp Leu Ser Pro Gln His Ser Thr Lys Ser Ile Gly Thr Lys Thr
            20                  25                  30

Ser Arg Ala Arg His Ser Ile Thr Ser Val Leu Gln Ser Thr His Leu
        35                  40                  45

Gly Pro Gln Thr Ser Asp Arg Pro Val His Tyr Ile Lys Asn Arg Thr
    50                  55                  60
```

```
Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Gly Asn Ile Ser Ala His
65                  70                  75                  80

Arg Asp His Asp Gly Ile Val His His Ala Pro Glu Ser Val Ser Gln
                85                  90                  95

Glu Ala Arg Ser Leu Phe Lys Arg Arg Gln Ser Asn Ala Thr Asp Ser
            100                 105                 110

Gly Phe Gln Cys Thr Trp Leu Ile Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Arg Thr Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Asn Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
```

```
        275                 280                 285

Gly Ile Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495
```

```
Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Ala Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 189
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 189
Met His Asn Lys Ile Pro Lys Arg Ser Arg Thr Arg Thr His Thr Arg

```
1               5                   10                  15

Gln Asp Leu Ser Pro Gln His Ser Thr Lys Ser Ile Gly Thr Lys Thr
            20                  25                  30

Ser Arg Ala Arg His Ser Ile Thr Ser Val Leu Gln Ser Thr His Leu
        35                  40                  45

Gly Pro Gln Thr Ser Asp Arg Pro Val His Tyr Ile Lys Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Gly Asn Ile Ser Ala His
65                  70                  75                  80

Arg Asp His Asp Gly Ile Val His His Ala Pro Glu Ser Val Ser Gln
                85                  90                  95

Glu Ala Arg Ser Leu Phe Lys Arg Arg Gln Ser Asn Ala Thr Asp Ser
            100                 105                 110

Gly Phe Gln Cys Thr Trp Leu Ile Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Arg Thr Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Asn Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220
```

```
Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Ile Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430
```

```
Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640
```

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 190
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 190
Met His Asn Lys Ile Pro Lys Arg Ser Arg Thr Arg Thr His Thr Arg
1 5 10 15

Gln Asp Leu Ser Pro Gln His Ser Thr Lys Ser Ile Gly Thr Lys Thr
20 25 30

Ser Arg Ala Arg His Ser Ile Thr Ser Val Leu Gln Ser Thr His Leu
35 40 45

Gly Pro Gln Thr Ser Asp Arg Pro Val His Tyr Ile Lys Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Gly Asn Ile Ser Ala His
65 70 75 80

Arg Asp His Asp Gly Ile Val His His Ala Pro Glu Ser Val Ser Gln
85 90 95

Glu Ala Arg Ser Leu Phe Lys Arg Arg Gln Ser Asn Ala Thr Asp Ser
100 105 110

Gly Phe Gln Cys Thr Trp Leu Ile Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

```
Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Arg Thr Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Asn Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Ile Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365
```

```
Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
```

580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 191
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 191
Met His Asn Lys Ile Pro Lys Arg Ser Arg Thr Arg Thr His Thr Arg
1 5 10 15

Gln Gly Leu Ser Pro Gln His Ser Thr Lys Ser Ile Gly Thr Lys Thr
20 25 30

Ser Arg Ala Arg His Ser Ile Thr Ser Ala Leu Gln Ser Thr His Leu
35 40 45

Gly Pro Gln Thr Ser Asp Arg Pro Val His Tyr Ile Lys Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Gly Asn Ile Ser Ala His
65 70 75 80

Arg Asp His Asp Gly Ile Ile His His Ala Pro Glu Ser Val Ser Gln
85 90 95

```
Glu Ala Arg Ser Leu Ser Lys Arg Arg Gln Ser Asn Ala Thr Asp Ser
            100                 105                 110

Gly Phe Gln Cys Thr Trp Leu Ile Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Arg Thr Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Asn Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
```

```
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525
```

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
530 535 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545 550 555 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 192
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 192
Met His Asn Lys Ile Pro Lys Arg Ser Arg Thr Arg Thr His Thr Arg
1 5 10 15

Gln Asp Leu Ser Pro Gln His Ser Thr Glu Ser Ile Gly Thr Lys Thr
20 25 30

Ser Arg Gly Arg His Ile Ile Thr Ser Ala Leu Gln Ser Thr His Leu

```
        35                  40                  45

Gly Pro Gln Thr Ser Asp Arg Pro Val His Tyr Ile Lys Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Ala Ser Tyr Arg Ser Gly Asn Ile Ser Ala His
65                  70                  75                  80

Arg Asp His Asp Gly Ile Ile His His Ala Pro Glu Ser Val Ser Gln
                85                  90                  95

Glu Ala Arg Ser Leu Phe Lys Arg Arg Gln Ser Asn Ala Thr Asp Ser
            100                 105                 110

Gly Phe Gln Cys Thr Trp Leu Ile Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Arg Thr Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Asn Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255
```

```
Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Leu Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Val Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460
```

```
Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Cys Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 193
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 193
Met His Asn Lys Ile Leu Glu Gly Ser Lys Thr Gln Met His Thr Gln
1   5   10   15

Gln Asn Pro Pro Ser Gln His Ser Thr Lys Ser Ser Gly Thr Lys Thr
            20   25   30

Ser Gln Thr Arg His Ser Thr Thr Ser Ala Gln Arg Ser Thr His His
        35   40   45

Gly Pro Arg Thr Ala Asp Arg Pro Val His Tyr Thr Met Asp Arg Thr
    50   55   60

Arg Ser Cys Lys Gln Ala Gly His Arg Ser Asp Ser Ile Pro Val Arg
65   70   75   80

Gly Asp His Glu Gly Ile Ile His His Thr Leu Glu Gly Ile Ser Gln
                85   90   95

Gly Ala Arg Ser Arg Phe Lys Arg Arg Gln Ser Thr Ala Thr Ser Pro
            100   105   110

Gly Pro Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Glu Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

```
Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400
```

```
Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Ser Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Arg Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Leu Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
```

610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Arg Gln Asn
625 630 635 640

Pro Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 194
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 194
Met His Asn Lys Ile Leu Glu Gly Ser Lys Thr Gln Met His Thr Gln
1 5 10 15

Gln Asn Pro Pro Ser Gln His Ser Thr Lys Ser Ser Gly Thr Lys Thr
20 25 30

Ser Gln Thr Arg His Ser Thr Thr Ser Ala Gln Arg Ser Thr His His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Pro Val His Tyr Thr Met Asp Arg Thr
50 55 60

Arg Ser Cys Lys Gln Ala Gly His Arg Ser Asp Ser Ile Pro Val Arg
65 70 75 80

Gly Asp His Glu Gly Ile Ile His His Thr Leu Glu Ser Ile Ser Gln
85 90 95

Gly Ala Arg Ser Arg Phe Lys Arg Arg Gln Ser Thr Ala Thr Ser Pro
100 105 110

Gly Pro Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

```
Leu Phe Leu Cys Ser Glu Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Ala Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Ile Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
```

```
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Arg Val Ala Leu
545                 550                 555                 560
```

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Leu Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Pro Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Leu Arg Gln Asn
625 630 635 640

Pro Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 195
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 195
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr Tyr
35 40 45

Ser Pro Gln Ala Leu Asp Arg Ser Ile His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asn Asn Ile Pro Pro His

```
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Ala Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285
```

```
Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495
```

```
Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 196
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 196

```
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15
```

```
Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr Tyr
        35                  40                  45

Ser Pro Gln Thr Leu Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asn Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His Tyr Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220
```

```
Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Ala Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430
```

```
Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
```

645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 197
<211> 661
<212> PRT
<213> Canine morbillivirus

<400> 197
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Arg Ser Thr Tyr His Gly
35 40 45

Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr Arg
50 55 60

Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His Arg
65 70 75 80

Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln Gly
85 90 95

Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala Gly
100 105 110

Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser Leu
115 120 125

Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr Ile
130 135 140

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

```
Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu Ile
                165                 170                 175

Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu Asn
            180                 185                 190

Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn Asn
        195                 200                 205

Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg Phe
    210                 215                 220

Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala Ala
225                 230                 235                 240

Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala Gln
                245                 250                 255

Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala Ile
            260                 265                 270

Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln Gly
        275                 280                 285

Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His Met
    290                 295                 300

Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg Tyr
305                 310                 315                 320

Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro Ile
                325                 330                 335

Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly Glu
            340                 345                 350

Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met Ile
        355                 360                 365

Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val Asp
```

```
    370                 375                 380

Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu Ser
385                 390                 395                 400

Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr Asn
                405                 410                 415

Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala Thr
            420                 425                 430

Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe Val
        435                 440                 445

Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser Pro
    450                 455                 460

Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg Thr
465                 470                 475                 480

Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly Asn
                485                 490                 495

Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr Ser
            500                 505                 510

Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala Ser
        515                 520                 525

Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val Gly
    530                 535                 540

Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu Gly
545                 550                 555                 560

Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly Asn
                565                 570                 575

Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser Asn
            580                 585                 590
```

Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser Leu
595 600 605

Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu Leu
610 615 620

Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn Thr
625 630 635 640

Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys Ser
645 650 655

Tyr Val Arg Ser Leu
660

<210> 198
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 198
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Pro Leu Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65 70 75 80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
85 90 95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala

```
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320
```

```
Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525
```

```
Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 199
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 199
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15

Gln Asp Pro Leu Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45
```

```
Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255
```

```
Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460
```

```
Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Ser Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 200

<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 200
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1   5   10   15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
            20   25   30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35   40   45

Ser Pro Arg Thr Ser Asp Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50   55   60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65   70   75   80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85   90   95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

```
Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
```

```
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asn Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620
```

```
Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Val Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 201
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 201
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15


Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
            20                  25                  30


Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45


Ser Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60


Arg Ser Cys Asn Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80


Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95


Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110


Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125


Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
```

```
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350
```

```
Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560
```

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 202
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 202
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Val Gln Arg Ser Thr Tyr His
35 40 45

Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65 70 75 80

```
Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Arg
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Pro Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285
```

```
Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495
```

```
Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 203
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 203

```
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15
```

```
Gln Asp Pro Pro Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Val Gln Arg Ser Thr Tyr His
        35                  40                  45

Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Met Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

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

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Pro Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220
```

```
Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240


Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255


Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270


Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285


Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300


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


Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335


Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350


Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365


Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380


Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400


Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415


Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430


Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
```

```
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655
```

Ser Tyr Val Arg Ser Leu
            660

<210> 204
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 204
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1   5   10   15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
            20   25   30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35   40   45

Ser Pro Arg Thr Ser Asp Arg Ser Val His Cys Ile Met Asn Arg Thr
    50   55   60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65   70   75   80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85   90   95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100   105   110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu

```
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile His Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Ser Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Arg Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590
```

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 205
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 205
Met His Asn Lys Ile Ser Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Pro Leu Gln Gln His Ser Asn Arg Ser Thr Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
35 40 45

Ser Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Val Pro Pro His
65 70 75 80

Arg Asp His Glu Asp Ile Ile His His Thr Pro Glu Ser Val Thr Gln
85 90 95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
100 105 110

```
Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Ile Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Ala Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320
```

```
Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525
```

```
Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 206
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 206
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His His
        35                  40                  45
```

```
Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Thr Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Ser
        195                 200                 205

Asn Val Lys Pro Leu Gln Ala Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255
```

```
Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
```

```
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Ala Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 207
<211> 662

<212> PRT
<213> Canine morbillivirus

<400> 207
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1   5   10   15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20   25   30

Ser Gln Gly Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His His
        35   40   45

Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50   55   60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65   70   75   80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85   90   95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100   105   110

Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Thr Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Ser

```
        195                 200                 205

Asn Val Lys Pro Leu Gln Ala Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415
```

```
Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620
```

```
Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 208
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 208
Met His Ser Thr Thr Pro Lys Asn Ser Lys Pro Leu Pro His Ile Arg
1               5                   10                  15


Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30


Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45


Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60


Arg Ser Cys Lys Gln Thr Ser His Ser Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80


Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Arg
                85                  90                  95


Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110


Gly Ser Gln His Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125


Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140
```

```
Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Lys His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350
```

```
Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Ser Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Thr Val Ala Leu
545                 550                 555                 560
```

```
Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575


Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590


Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Ile Tyr Cys Cys Lys Gly Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640


Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 209
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 209
Met His Ser Thr Thr Pro Lys Asn Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15


Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30


Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45


Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60


Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80
```

```
Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Arg
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285
```

```
Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Lys His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Ser Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
```

```
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 210
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 210
Met His Ser Lys Thr Leu Lys Asn Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15
```

```
Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45

Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Arg
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Thr Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
```

```
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445
```

```
Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655
```

Ser Tyr Val Arg Ser Leu
660

<210> 211
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 211
Met His Ser Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Leu Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
20 25 30

Ser Gln Gly Gln Tyr Ser Leu Thr Ser Asp Gln Arg Ser Thr Tyr His
35 40 45

Ser Pro Arg Thr Ser Asp Gly Ser Val His Cys Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65 70 75 80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
85 90 95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Arg Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590
```

```
Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 212
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 212

```
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro Asn Pro Arg
1               5                   10                  15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45

Ser Pro Arg Thr Ser Asp Arg Ser Val His His Thr Met Asn Arg Thr
    50                  55                  60

Arg Ser Arg Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Asn Val Thr Gln
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110
```

```
Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320
```

```
Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
```

```
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 213
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 213
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Pro Arg Ser Thr Tyr His
        35                  40                  45
```

```
Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Lys Thr
    50                  55                  60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Phe His His Thr Pro Glu Ser Val Thr Arg
                85                  90                  95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Tyr Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
```

```
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Thr Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480
```

```
Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 214
<211> 660
<212> PRT

<213> Canine morbillivirus

<400> 214

```
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15


Gln Asp Pro Leu Gln Gln His Ser Ile Arg Ser Ala Glu Thr Lys Thr
            20                  25                  30


Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45


Gly Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Lys Thr
    50                  55                  60


Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80


Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Arg
                85                  90                  95


Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110


Gly Ser Gln Tyr Thr Trp Leu Val Leu Trp Cys Gly Ile Ala Ser Leu
        115                 120                 125


Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr Ile
    130                 135                 140


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


Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu Ile
                165                 170                 175


Asp Asn Cys Thr Lys Glu Leu Gly Glu Tyr Glu Lys Leu Leu Asn Ser
            180                 185                 190


Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn Asn Val
        195                 200                 205
```

```
Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg Phe Ala
    210                 215                 220

Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala Ala Gln
225                 230                 235                 240

Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala Gln Ala
                245                 250                 255

Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala Ile Glu
            260                 265                 270

Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln Gly Val
        275                 280                 285

Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His Met Ser
    290                 295                 300

Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg Tyr Tyr
305                 310                 315                 320

Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro Ile Ser
                325                 330                 335

Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly Glu Ile
            340                 345                 350

His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met Ile Ala
        355                 360                 365

Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val Asp Leu
    370                 375                 380

Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu Ser Glu
385                 390                 395                 400

Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr Asn Ile
                405                 410                 415
```

```
Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala Thr Asn
            420                 425                 430

Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe Val Ser
        435                 440                 445

Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser Pro Ile
    450                 455                 460

Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg Thr Leu
465                 470                 475                 480

Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly Asn Ile
                485                 490                 495

Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr Ser Thr
            500                 505                 510

Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala Ser Asp
        515                 520                 525

Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val Gly Gly
    530                 535                 540

Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu Gly Pro
545                 550                 555                 560

Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly Asn Ala
                565                 570                 575

Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser Asn Gln
            580                 585                 590

Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser Leu Leu
        595                 600                 605

Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu Leu Ile
    610                 615                 620
```

Tyr Cys Cys Lys Arg Arg Tyr Gln Gln Thr Phe Lys His Asn Thr Lys
625 630 635 640

Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys Ser Tyr
645 650 655

Val Arg Ser Leu
660

<210> 215
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 215
Met His Asn Lys Ile Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asp Pro Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg His Ser Thr Thr Ser Ala Gln Gln Ser Thr His His
35 40 45

Ser Pro Arg Thr Ser Asp Arg Ser Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Pro His
65 70 75 80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
85 90 95

Gly Ser Ser Ser Trp Cys Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

```
Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Leu Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Phe Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

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

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350
```

```
Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Arg Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
```

565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 216
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 216
Met His Asn Lys Thr Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asn Pro Leu Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr His His
35 40 45

Gly Pro Arg Thr Ser Asn Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Met Gln Thr Ser His Arg Ser Asp Asn Ile Pro Asp His
65 70 75 80

```
Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Val Gly Phe Trp Phe Lys Arg Arg Arg Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Leu Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
```

```
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Ile Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510
```

```
Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Met Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660
```

<210> 217
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 217

```
Met His Asn Lys Thr Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1               5                   10                  15

Gln Asn Pro Leu Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
```

```
            20                  25                  30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr His His
        35                  40                  45

Gly Pro Arg Thr Ser Asn Arg Pro Val His Tyr Ile Met Asn Arg Thr
    50                  55                  60

Arg Ser Cys Met Gln Thr Ser His Arg Ser Asp Asn Ile Pro Asp His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Val Gly Phe Trp Phe Lys Arg Arg Arg Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Leu Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240
```

```
Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445
```

```
Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Ile Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Met Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655
```

Ser Tyr Val Arg Ser Leu
660

<210> 218
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 218
Met His Asn Lys Thr Pro Lys Lys Ser Lys Pro Leu Pro His Thr Arg
1 5 10 15

Gln Asn Pro Leu Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr His His
35 40 45

Gly Pro Arg Thr Ser Asn Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Met Gln Thr Ser His Arg Ser Asp Asn Ile Leu Asp His
65 70 75 80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
85 90 95

Gly Val Gly Phe Trp Phe Lys Arg Arg Arg Ser Asn Ala Thr Asn Ala
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Leu Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380
```

```
Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Ile Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Lys Arg Ser Ser Phe Asn Phe Gly Ser
```

595 600 605

Met Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 219
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 219
Met His Asn Lys Ile Pro Lys Arg Ser Lys Thr Leu Pro His Thr Arg
1 5 10 15

Gln Asp Leu Leu Gln Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Ser Gln Gly Arg Tyr Ser Ile Ser Ser Ala Gln Arg Ser Ala His His
35 40 45

Gly Pro Leu Thr Ser Asn Arg Pro Val His Tyr Ile Met Asn Arg Thr
50 55 60

Arg Ser Cys Lys Gln Thr Ser His Arg Ser Asp Asn Ile Pro Ala His
65 70 75 80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Gly Val Thr Gln
85 90 95

Gly Ala Ser Ser Trp Phe Lys Arg Arg Gln Ser Asn Ala Ser Asn Pro
100 105 110

```
Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Met Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Asn Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
```

```
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Phe Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Ala Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Lys Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Ile Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Ile Thr Ile Gln Val
    530                 535                 540
```

```
Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560


Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575


Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590


Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605


Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620


Leu Val Tyr Cys Cys Lys Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640


Pro Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655


Ser Tyr Val Arg Ser Leu
            660


<210> 220
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 220
Met His Asn Lys Ile Pro Lys Lys Ser Asn Pro Arg Gln His Thr Arg
1               5                   10                  15


Gln Asp Leu Leu Gln Gln His Ser Thr Arg Ser Thr Glu Thr Lys Thr
            20                  25                  30


Ser Gln Gly Arg Tyr Ser Ile Thr Ser Ala Gln Arg Ser Thr Tyr His
        35                  40                  45


Ser Pro Leu Ala Leu Asp Arg Ser Ile His Tyr Ile Met Asn Arg Thr
```

```
    50                  55                  60

Arg Ser Cys Lys Gln Ala Ser His Arg Ser Asp Asn Ile Pro Pro His
65                  70                  75                  80

Arg Asp His Glu Gly Ile Ile His His Thr Pro Glu Ser Val Thr Gln
                85                  90                  95

Gly Ala Gly Ser Trp Leu Lys Arg Trp Gln Ser Asn Ala Thr Asn Ala
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Val Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Asn
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270
```

```
Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Leu Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Ile
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Glu Tyr Val Ala
            420                 425                 430

Thr Ile Gly Tyr Leu Ile Ser Asn Leu Asp Glu Ser Pro Cys Val Ser
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Phe Leu Tyr Pro Met Ser
    450                 455                 460

Arg Ser Thr Gln Gln Cys Ile Arg Arg Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480
```

```
Leu Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Gly Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Asp Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Asp Lys Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ile Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Arg Arg Arg Tyr Arg Gln Thr Phe Lys His Asn
625                 630                 635                 640

Ala Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
            660


<210> 221
<211> 662
<212> PRT
<213> Canine morbillivirus
```

<400> 221
Met His Lys Lys Phe Phe Lys Asn Ser Thr Thr Gln Thr His Thr Gln
1   5   10   15

Gln Asp Leu Leu Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
            20   25   30

Ser Arg Ala Arg His Ser Ile Thr Ser Val Gln Arg Ser Thr His Tyr
        35   40   45

Gly Pro Arg Thr Ser Asp Arg Pro Val Tyr Tyr Thr Val Asn Arg Thr
    50   55   60

Gly Ser Cys Lys Gln Ala Ser Tyr Arg Ser Asp Asn Ile Pro Pro His
65   70   75   80

Gly Asp His Glu Gly Thr Val Leu His Thr Pro Glu Ser Val Ser Gln
                85   90   95

Gly Met Arg Ser Trp Pro Lys Gly Arg Gln Ser Asn Ala Ile Asn Thr
            100   105   110

Asp Ser His Cys Ala Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Ser
        115   120   125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130   135   140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145   150   155   160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Val
                165   170   175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180   185   190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195   200   205

```
Asn Val Lys Pro Leu Gln Ser Val Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Ile Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Val Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415
```

```
Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Leu
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Thr Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Ala Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Arg Arg Arg Tyr Gln Gln Thr Ile Lys Gln Asn
```

625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 222
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 222
Met His Arg Lys Pro Pro Lys Lys Ser Lys Thr Gln Thr His Thr Gln
1 5 10 15

Arg Asp Pro Pro Pro Gln His Ser Thr Lys Ser Ala Glu Thr Lys Thr
20 25 30

Pro Arg Ala Arg His Ser Ile Thr Ser Ala Gln Arg Ser Thr His Tyr
35 40 45

Gly Pro Arg Thr Ser Asp Arg Pro Ile His Tyr Thr Val Asn Arg Thr
50 55 60

Gly Ser Cys Lys Gln Ala Ser Tyr Arg Leu Asp Asn Ile Pro Pro His
65 70 75 80

Gly Asp His Glu Gly Thr Val Leu His Thr Pro Glu Ser Val Ser Gln
85 90 95

Gly Val Arg Ser Lys Pro Lys Gly Arg Gln Ser Asn Ala Ile Asn Ile
100 105 110

Ala Ser His Cys Ala Trp Leu Ile Leu Trp Cys Ile Gly Ile Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

```
Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Pro Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Lys Pro Leu Gln Ser Ile Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Ala Gln Glu Thr Val Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Asn Asp Met
```

```
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Pro Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Val Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Val Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Thr Ser Cys Ala Arg
465                 470                 475                 480

Thr Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575
```

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Val Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Ser Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Arg Arg Arg Tyr Gln Gln Thr Ile Lys Gln Asn
625 630 635 640

Thr Lys Val Asp Pro Thr Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 223
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 223
Met His Gly Glu Ile Pro Thr Gly Ser Thr Thr Arg Thr His Thr Gln
1 5 10 15

Gln Asp Arg Pro Ser His Pro Ser Thr Lys Pro Asp Glu Thr Arg Ile
20 25 30

Ser Arg Thr Gln His Gly Thr Thr Ser Ala Lys Arg Ser Thr Asp His
35 40 45

Asp Pro Arg Lys Ser Asp Arg Pro Val His Tyr Thr Met Asn Arg Ala
50 55 60

Arg Ser His Lys His Ile Gly His Gly Pro Glu Asn Ile Pro Ala His
65 70 75 80

Gly Asp His Glu Ala Thr Thr Gln His Ile Pro Glu Ser Ala Ser Lys

```
                85                  90                  95

Gly Ala Lys Ser Gln Leu Glu Arg Arg Gln Ser Asp Ala Ile Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Phe Gly Met Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Ser Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Arg Ser Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300
```

```
Met Ser Cys Glu Leu Val Gly Gln Arg Leu Gly Leu Lys Leu Leu Arg
305                 310                 315                 320

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Leu Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Ser Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510
```

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
515 520 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
530 535 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545 550 555 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Arg Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Ala Lys Val Asn Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 224
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 224
Met His Gly Glu Ile Pro Thr Gly Ser Thr Thr Arg Thr His Thr Gln
1 5 10 15

Gln Asp Arg Pro Ser His Pro Ser Thr Lys Pro Asp Glu Thr Arg Ile
20 25 30

```
Ser Arg Thr Gln His Gly Thr Thr Ser Ala Lys Arg Ser Thr Asp His
        35                  40                  45

Asp Pro Arg Lys Ser Asp Arg Pro Val His Tyr Thr Met Asn Arg Ala
    50                  55                  60

Arg Ser His Lys His Ile Gly His Gly Pro Glu Asn Ile Pro Ala His
65                  70                  75                  80

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

Gly Ala Lys Ser Gln Leu Glu Arg Arg Gln Ser Asp Ala Ile Asn Ser
            100                 105                 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Phe Gly Thr Ala Ser
        115                 120                 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
    130                 135                 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145                 150                 155                 160

Ser Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
                165                 170                 175

Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Arg Ser Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240
```

```
Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Leu Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
385                 390                 395                 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
                405                 410                 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
            420                 425                 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
        435                 440                 445
```

```
Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
    450                 455                 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465                 470                 475                 480

Ser Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
                485                 490                 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
            500                 505                 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
        515                 520                 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
    530                 535                 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545                 550                 555                 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
                565                 570                 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
            580                 585                 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
        595                 600                 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
    610                 615                 620

Leu Ile Tyr Cys Cys Arg Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625                 630                 635                 640

Ala Lys Val Asn Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
                645                 650                 655

Ser Tyr Val Arg Ser Leu
```

660

<210> 225
<211> 662
<212> PRT
<213> Canine morbillivirus

<400> 225
Met His Gly Glu Ile Pro Thr Gly Ser Thr Thr Arg Thr His Thr Gln
1 5 10 15

Gln Asp Arg Pro Ser His Pro Ser Thr Lys Pro Asp Glu Thr Arg Ile
20 25 30

Ser Arg Thr Gln His Gly Thr Thr Ser Ala Lys Arg Ser Thr Asp His
35 40 45

Asp Pro Arg Lys Ser Asp Arg Pro Val His Tyr Thr Met Asn Arg Ala
50 55 60

Arg Ser His Lys His Ile Gly His Gly Pro Glu Asn Ile Pro Ala His
65 70 75 80

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

Gly Ala Lys Ser Gln Leu Glu Arg Arg Gln Ser Asp Ala Ile Asn Ser
100 105 110

Gly Ser Gln Cys Thr Trp Leu Val Leu Trp Cys Phe Gly Thr Ala Ser
115 120 125

Leu Phe Leu Cys Ser Lys Ala Gln Ile His Trp Asn Asn Leu Ser Thr
130 135 140

Ile Gly Ile Ile Gly Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg
145 150 155 160

Ser Ser His Gln Tyr Leu Val Ile Lys Leu Met Pro Asn Val Ser Leu
165 170 175

```
Ile Asp Asn Cys Thr Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu
            180                 185                 190

Asn Ser Val Leu Glu Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys
        195                 200                 205

Asn Val Arg Ser Leu Gln Ser Leu Gly Ser Gly Arg Arg Gln Lys Arg
    210                 215                 220

Phe Ala Gly Val Val Leu Ala Gly Ala Ala Leu Gly Val Ala Thr Ala
225                 230                 235                 240

Ala Gln Ile Thr Ala Gly Ile Ala Leu His Gln Ser Asn Leu Asn Ala
                245                 250                 255

Gln Ala Ile Gln Ser Leu Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala
            260                 265                 270

Ile Glu Glu Ile Arg Glu Ala Thr Gln Glu Thr Ile Ile Ala Val Gln
        275                 280                 285

Gly Val Gln Asp Tyr Val Asn Asn Glu Leu Val Pro Ala Met Gln His
    290                 295                 300

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

Tyr Tyr Thr Glu Leu Leu Ser Ile Phe Gly Pro Ser Leu Arg Asp Pro
                325                 330                 335

Ile Ser Ala Glu Ile Ser Ile Gln Ala Leu Ser Tyr Ala Leu Gly Gly
            340                 345                 350

Glu Ile His Lys Ile Leu Glu Lys Leu Gly Tyr Ser Gly Gly Asp Met
        355                 360                 365

Ile Ala Ile Leu Glu Ser Arg Gly Ile Lys Thr Lys Ile Thr His Val
    370                 375                 380

Asp Leu Leu Gly Lys Phe Ile Ile Leu Ser Ile Ser Tyr Pro Thr Leu
```

385 390 395 400

Ser Glu Val Lys Gly Val Ile Val His Arg Leu Glu Ala Val Ser Tyr
405 410 415

Asn Ile Gly Ser Gln Glu Trp Tyr Thr Thr Val Pro Arg Tyr Ile Ala
420 425 430

Thr Asn Gly Tyr Leu Ile Ser Asn Phe Asp Glu Ser Ser Cys Val Phe
435 440 445

Val Ser Glu Ser Ala Ile Cys Ser Gln Asn Ser Leu Tyr Pro Met Ser
450 455 460

Pro Leu Leu Gln Gln Cys Ile Arg Gly Asp Thr Ser Ser Cys Ala Arg
465 470 475 480

Ser Leu Val Ser Gly Thr Met Gly Asn Lys Phe Ile Leu Ser Lys Gly
485 490 495

Asn Ile Val Ala Asn Cys Ala Ser Ile Leu Cys Lys Cys Tyr Ser Thr
500 505 510

Ser Thr Ile Ile Asn Gln Ser Pro Asp Lys Leu Leu Thr Phe Ile Ala
515 520 525

Ser Asp Thr Cys Pro Leu Val Glu Ile Asp Gly Val Thr Ile Gln Val
530 535 540

Gly Gly Arg Gln Tyr Pro Asp Met Val Tyr Glu Ser Lys Val Ala Leu
545 550 555 560

Gly Pro Ala Ile Ser Leu Glu Arg Leu Asp Val Gly Thr Asn Leu Gly
565 570 575

Asn Ala Leu Lys Lys Leu Asp Asp Ala Lys Ile Leu Ile Asp Ser Ser
580 585 590

Asn Gln Ile Leu Glu Thr Val Arg Arg Ser Ser Phe Asn Phe Gly Ser
595 600 605

Leu Leu Ser Val Pro Ile Leu Ser Cys Thr Ala Leu Ala Leu Leu Leu
610 615 620

Leu Ile Tyr Cys Cys Arg Arg Arg Tyr Gln Gln Thr Leu Lys Gln Asn
625 630 635 640

Ala Lys Val Asn Pro Ala Phe Lys Pro Asp Leu Thr Gly Thr Ser Lys
645 650 655

Ser Tyr Val Arg Ser Leu
660

<210> 226
<211> 653
<212> PRT
<213> Canine morbillivirus

<400> 226
Met His Asn Lys Ile Pro Lys Arg Ser Lys Thr Arg Thr His Gln Gln
1 5 10 15

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

Ala Arg His Ser Thr Thr Ser Ala Leu Arg Ser Thr His His Gly Arg
35 40 45

Ile Ser Asp Ile His His Ile Met Asn Arg Thr Arg Ser Cys Arg Gln
50 55 60

Ala Ser His Arg Ser Asp Asn Ile Pro Ala His Gly Asp His Glu Gly
65 70 75 80

Ile Ile His His Thr Pro Glu Ser Val Ser Gln Gly Ala Gly Pro Arg
85 90 95

Leu Lys Gly Gln Arg Tyr Asn Ala Thr Asn Ser Gly Ser Gln Cys Thr
100 105 110

Trp Leu Val Leu Trp Cys Ile Gly Ile Ala Gly Leu Phe Leu Cys Ser

```
        115                 120                 125

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

Thr Asp Ser Val His Tyr Lys Ile Met Thr Arg Pro Ser His Gln Tyr
145                 150                 155                 160

Leu Val Ile Lys Leu Met Pro Asn Val Ser Ile Ile Asp Asn Cys Thr
                165                 170                 175

Lys Ala Glu Leu Gly Glu Tyr Glu Lys Leu Leu Asn Ser Val Leu Glu
            180                 185                 190

Pro Ile Asn Gln Ala Leu Thr Leu Met Thr Lys Asn Val Lys Pro Leu
        195                 200                 205

Gln Ser Val Gly Ser Gly Arg Arg Gln Arg Arg Phe Ala Gly Val Val
    210                 215                 220

Ala Gly Ala Ala Leu Gly Val Ala Thr Ala Ala Gln Ile Thr Ala Gly
225                 230                 235                 240

Ile Ala Leu His Gln Ser Ser Leu Asn Ala Gln Ala Ile Gln Ser Leu
                245                 250                 255

Arg Thr Ser Leu Glu Gln Ser Asn Lys Ala Ile Glu Glu Ile Arg Glu
            260                 265                 270

Ala Thr Gln Glu Thr Val Ile Ala Val Gln Gly Val Gln Asp Tyr Val
        275                 280                 285

Asn Asn Glu Leu Val Ala Met Gln His Met Ser Cys Glu Leu Gly Gln
    290                 295                 300

Arg Leu Gly Leu Lys Leu Leu Arg Tyr Tyr Thr Glu Leu Leu Ser Ile
305                 310                 315                 320

Phe Gly Pro Ser Leu Arg Asp Pro Ile Ser Ala Glu Ile Ser Ile Gln
                325                 330                 335
```

```
Ala Leu Ser Tyr Ala Leu Gly Gly Glu Ile His Lys Ile Leu Glu Lys
            340                 345                 350

Leu Gly Tyr Ser Gly Asn Asp Met Ile Ala Ile Leu Glu Ser Arg Gly
        355                 360                 365

Ile Lys Thr Lys Ile Thr His Val Asp Leu Pro Gly Lys Leu Ile Ile
    370                 375                 380

Leu Ser Ile Ser Tyr Pro Thr Leu Ser Glu Val Lys Gly Val Ile Val
385                 390                 395                 400

His Arg Leu Glu Ala Val Ser Tyr Asn Ile Gly Ser Gln Trp Tyr Thr
                405                 410                 415

Thr Val Pro Arg Tyr Val Ala Thr Asn Gly Tyr Leu Ile Ser Asn Phe
            420                 425                 430

Asp Glu Ser Ser Cys Val Phe Val Ser Glu Ser Ala Ile Cys Ser Gln
        435                 440                 445

Asn Ser Leu Tyr Pro Met Ser Pro Leu Leu Gln Gln Cys Ile Arg Gly
    450                 455                 460

Asp Thr Ser Ser Cys Ala Arg Thr Leu Val Ser Gly Thr Met Gly Asn
465                 470                 475                 480

Lys Phe Ile Leu Ser Lys Gly Asn Ile Val Ala Asn Cys Ala Ser Ile
                485                 490                 495

Leu Cys Lys Cys Tyr Ser Thr Ser Thr Ile Ile Asn Gln Gly Pro Asp
            500                 505                 510

Lys Leu Leu Thr Phe Ile Ala Ser Asp Thr Cys Pro Leu Val Glu Ile
        515                 520                 525

Asp Gly Val Thr Ile Gln Val Gly Gly Arg Gln Tyr Pro Asp Met Val
    530                 535                 540
```

```
Tyr Glu Ser Lys Val Ala Leu Gly Pro Ala Ile Ser Leu Glu Arg Leu
545                 550                 555                 560


Asp Val Gly Thr Asn Leu Gly Asn Ala Leu Lys Lys Leu Asp Asp Ala
                565                 570                 575


Lys Val Leu Ile Asp Ser Ser Asn Gln Ile Leu Glu Thr Val Arg Arg
            580                 585                 590


Ser Ser Phe Asn Phe Gly Ser Leu Leu Ser Val Pro Ile Leu Ile Cys
        595                 600                 605


Thr Ala Leu Ala Leu Leu Phe Leu Ile Tyr Cys Cys Lys Arg Arg Tyr
    610                 615                 620


Gln Gln Thr Leu Lys Gln Ser Thr Lys Val Asp Pro Thr Phe Lys Pro
625                 630                 635                 640


Asp Leu Thr Gly Thr Ser Lys Ser Tyr Val Arg Ser Leu
                645                 650


<210> 227
<211> 80
<212> PRT
<213> Canine morbillivirus

<400> 227
Lys Ser Ile Ala Ser Ala Ala Asn Pro Ile Leu Leu Ser Ala Leu Ser
1               5                   10                  15


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


Thr Ser Val Gly Arg Val Phe Pro Leu Ser Val Ser Leu Ser Met Ser
        35                  40                  45


Leu Ile Ser Arg Thr Ser Glu Ile Ile Asn Met Leu Thr Ala Ile Ser
    50                  55                  60


Asp Gly Val Tyr Gly Lys Thr Tyr Leu Leu Val Pro Asp Phe Leu Glu
65                  70                  75                  80
```

<210> 228
<211> 80
<212> PRT
<213> Canine morbillivirus

<400> 228
Gly Ile Phe Gly Ala Thr Pro Met Asp Gln Val Glu Glu Val Ile Pro
1   5   10   15

Val Ala His Pro Ser Val Glu Lys Ile His Ile Ala Asn His Arg Gly
            20   25   30

Phe Ile Lys Asp Ser Ile Ala Thr Trp Met Val Pro Ala Leu Val Ser
        35   40   45

Glu Lys Gln Glu Glu Gln Lys Asn Cys Leu Glu Ser Ala Cys Gln Arg
    50   55   60

Lys Ser Tyr Pro Met Cys Asn Gln Thr Ser Trp Glu Pro Phe Gly Gly
65   70   75   80