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LAYTON, Sarah
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PIONTKOWSKI, Mike

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tgcaagttgg ggcatttctt gactcctcac tcttgcttct ggtggctttt tttgctgtgt 13380

accggcttgt cttggtcctt tgtcgatggc aacgacgaca gctcgacatc ccaatacata 13440

tataatttga cgatatgcga gctgaatggg accgaatggt tgtccggtca ttttgattgg 13500

gcagtcgaaa cctttgtgct ttacccagtt gccactcata tcatttcact gggttttctc 13560

acaacaagcc atttccttga tgcgctcggt ctcggcgctg tgtccgccac aggattcatt 13620

ggcgagcggt atgtacttag cagcatgtac ggcgtttgcg ccttcgcggc gttcgtatgt 13680

tttgtcatcc gtgctgctaa aaattgcatg gcttgccgct atgcccgcac ccggtttacc 13740

aacttcatcg tggacgaccg gggaagaatc catcgatgga agtcttcaat agtggtggag 13800

aaattgggca aagctgaagt cggtggtgac cttgtcaaca ttaagcatgt tgtcctcgaa 13860

ggggttaaag ctcaaccttt gacgaggact tcggctgagc aatgggaagc ctagacgact 13920

tttgcaacga tcccaccgcc gcacaaaaac tcgtgctggc ctttagcatc acatatacac 13980

ccataatgat atacgccctt aaggtgtcac gcggccgact cctggggctg ttgcacatct 14040

tgatatttct gaattgttcc tttacttttg ggtacatgac atatgtgcat tttcaatcca 14100

ccaaccgtgt cgcattcact ctgggggctg tagtcgccct tttgtggggt gtttacagcc 14160

tcacagagtc atggaagttc atcacttcca gatgcagatt gtgttgccta ggccggcgat 14220

acattctggc ccctgcccat cacgtagaaa gtgctgcagg cctccattca atcccagcgt 14280

ctggtaaccg agcatacgct gtgagaaagc ccggactaac atcagtgaac ggcactctag 14340

tacctgggct tcggagcctc gtgctgggcg gcaaacgagc tgttaaacga ggagtggtta 14400

acctcgtcaa gtatggccgg taagaaccag agccagaaga aaagaagaaa tgcagctccg 14460

atggggaaag gccagccagt caatcaactg tgccagttgc tgggtacaat gataaagtcc 14520

cagcgccagc aatctagggg aggacaggcc aaaaagaaga agcctgagaa gccacatttt 14580

cccctagctg ctgaagatga cattcggcac catctcaccc aggccgaacg ttccctctgc 14640

ttgcaatcga tccagacggc tttcaatcaa ggcgcaggaa ctgcgtcgct ttcatccagc 14700

gggaaggtca gtttccaggt tgagttcatg ctgccggttg ctcatacagt gcgcctgatt 14760

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cgcgattgac gtgtggcctc taa 14843

<210> 2
<211> 2349
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 1a OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 178..7227

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Phe Trp Asn Ala Gly Gln Val Tyr Cys Thr Arg Cys Leu Ser Ala Arg 20
25 30

Ser Leu Leu Ser Pro Glu Leu Gln Asp Thr Asp Leu Gly Ala Val Gly
40 45 35

Leu Phe His Lys Pro Lys Asp Lys Leu His Trp Lys Val Pro Ile Gly
55 60 50

Ile Pro Gln Val Glu Cys Ser Pro Ser Gly Cys Cys Trp Leu Ser Thr
70 75 80 65

Ile Phe Pro Leu Ala Arg Met Thr Ser Gly Asn His Asn Phe Leu Gln
85 90 95

Arg Leu Val Lys Val Ala Asp Val Leu Tyr Arg Asp Gly Cys Leu Thr
105 110 100

Pro Arg His Leu Arg Glu Leu Gln Val Tyr Glu Arg Gly Cys Asn Trp
120 125 115

Tyr Pro Ile Thr Gly Pro Val Pro Gly Met Ala Val Tyr Ala Asn Ser
135 140 130

Met His Val Ser Asp Gln Pro Phe Pro Gly Ala Thr His Val Leu Thr
150 155 160 145

Asn Ser Pro Leu Pro Gln Arg Ala Cys Arg Gln Pro Phe Cys Pro Phe
165 170 175

Glu Glu Ala His Ser Ser Ile Tyr Arg Trp Glu Lys Phe Val Ile Phe
185 190 180

Met Asp Ser Ser Ser Asp Gly Arg Ser Arg Met Met Trp Thr Pro Glu
200 205 195

Ser Asp Asp Ser Thr Ala Leu Glu Val Leu Pro Pro Glu Leu Glu His
215 220 210

Gln Val Lys Val Leu Val Arg Ser Phe Pro Ala His His Leu Val Asp
230 235 240 225

Leu Ala Asp Trp Glu Leu Thr Glu Ser Pro Asp Asn Gly Phe Ser Phe
245 250 255

Ser Thr Ser His Pro Cys Gly Tyr Leu Val Arg Asp Pro Ala Val Ser
265 270 260

Glu Gly Lys Cys Trp Leu Ser Cys Phe Leu Ser Gln Ser Ala Glu Val
280 285 275

Leu Ser Arg Glu Ala His Leu Ala Thr Ala Tyr Gly Tyr Gln Thr Lys
295 300 290

Trp Gly Val Pro Gly Lys Tyr Ile Gln Arg Arg Leu Gln Val His Gly
310 315 320 305

Leu Arg Ala Val Val Asp Pro Asp Gly Pro Ile His Val Glu Ala Leu
325 330 335

Ser Cys Pro Gln Ser Trp Ile Arg His Leu Thr Leu Asn Asp Asp Val
345 350 340

Thr Pro Gly Phe Val Arg Leu Met Ser Leu Arg Ile Val Pro Asn Thr
360 365 355

Glu Pro Thr Thr His Arg Ile Phe Arg Phe Gly Val His Lys Trp Tyr
375 380 370

Gly Ala Ala Gly Lys Arg Ala Arg Gly Lys Arg Ala Ala Lys Ser Glu
390 395 400 385

Lys Asp Ser Ala Ser Thr Leu Lys Val Ala Arg Pro Thr Ser Thr Ser
405 410 415

Gly Ile Val Thr Tyr Ser Pro Pro Ala Asp Gly Ser Cys Gly Trp His
425 430 420

Ala Leu Ala Ala Ile Leu Asn Arg Met Ile Asn Asn Asp Phe Thr Ser
440 445 435

Pro Leu Pro Arg Tyr Asn Arg Pro Glu Asp Asp Trp Ala Ser Asp Gly
455 460 450

Asp Leu Ala Gln Ala Ile Gln Cys Leu Gln Leu Pro Ala Ala Ile Ala
465

470 475 480

Arg Asn Arg Ala Cys Pro Asn Ala Lys Tyr Leu Ile Lys Leu Asn Gly
485 490 495

Val His Trp Glu Val Glu Val Arg Pro Gly Met Ala Pro Arg Ser Leu
505 510 500

Ser Arg Glu Cys Val Val Gly Val Cys Ser Glu Gly Cys Val Ala Ser
520 525 515

Pro Tyr Pro Glu Asp Gly Leu Pro Lys Arg Ala Leu Glu Ala Leu Ala
535 540 530

Ser Ala Tyr Arg Leu Pro Ser Asp Cys Val Cys Asp Gly Ile Ile Asp
550 555 560 545

Phe Leu Ala Asn Pro Pro Pro Gln Glu Phe Trp Thr Leu Asp Lys Met
565 570 575

Leu Thr Ser Pro Ser Pro Glu Gln Ser Gly Phe Ser Ser Leu Tyr Lys
585 590 580

Leu Leu Leu Glu Ile Leu Pro Gln Lys Cys Gly Ser Thr Glu Gly Glu
600 605 595

Phe Ile Tyr Thr Val Glu Arg Met Leu Lys Asp Cys Pro Ser Ser Lys
615 620 610

Gln Ala Met Ala Leu Leu Ala Lys Ile Lys Val Pro Ser Ser Lys Ala
630 635 640 625

Pro Ser Val Thr Leu Asn Glu Cys Phe Pro Thr Asp Val Pro Val Asn
645 650 655

Ser Glu Leu Ile Ser Trp Glu Glu Pro Lys Asp Pro Gly Ala Ala Val
665 670 660

Val Leu Cys Pro Ser Asp Ala Lys Glu Ser Lys Glu Thr Ala Pro Glu
680 685 675

Glu Ala Gln Ala Arg Asn Arg Lys Val Leu His Pro Val Val Leu Thr
695 700 690

Glu Glu Leu Ser Glu Gln Gln Val Gln Val Val Glu Gly Asp Gln Asp
710 715 720 705

Met Pro Leu Asp Leu Thr Trp Pro Thr Leu Thr Ala Thr Ala Thr Pro
725 730 735

Val Arg Gly Pro Val Pro Asp Asn Leu Ser Ser Gly Ile Gly Ala Gln
745 750 740

Pro Ala Thr Val Gln Glu Leu Ile Leu Ala Arg Pro Ala Pro Arg Leu
760 765 755

Val Glu Arg Cys Gly Thr Glu Ser Asn Gly Ser Ser Ser Phe Leu Asp
775 780 770

Leu Pro Asp Val Gln Thr Ser Asp Gln Pro Leu Asp Leu Ser Leu Ala
790 795 800 785

Ala Trp Pro Val Arg Ala Thr Ala Ser Asp Pro Gly Trp Ile His Gly
805 810 815

Arg Arg Glu Pro Val Phe Val Lys Pro Arg Gly Val Phe Ser Asp Gly
825 830 820

Glu Ser Ala Leu Gln Phe Gly Glu Leu Ser Glu Ala Ser Ser Val Val
840 845 835

Asp Asp Arg Thr Lys Glu Ala Pro Val Val Asp Ala Pro Ile Asp Leu
855 860 850

Thr Thr Ser Asn Glu Thr Leu Ser Gly Ser Asp Pro Phe Glu Phe Ala
870 875 880 865

Lys Phe Arg Arg Pro Arg Phe Ser Ala Gln Ala Leu Ile Asp Arg Gly
885 890 895

Gly Pro Leu Ala Asp Val His Ala Lys Ile Lys Ser Arg Val Tyr Glu
905 910 900

Gln Cys Leu Gln Ala Cys Glu Pro Gly Ser Arg Ala Thr Pro Ala Thr 915
920 925

Lys Lys Trp Leu Asp Lys Met Trp Asp Arg Val Asp Met Lys Thr Trp 930
935 940

Arg Cys Thr Ser Gln Phe Gln Ala Gly His Ile Leu Glu Ser Leu Lys 945
950 955 960

Phe Leu Pro Asp Met Ile Gln Asp Thr Pro Pro Pro Val Pro Arg Lys
965 970 975

Asn Arg Ala Gly Asp Ser Ala Gly Leu Lys Gln Leu Val Ala Gln Trp 980
985 990

Asp Arg Lys Ser Ser Val Thr Pro Pro Thr Lys Pro Val Gly Pro Val 995
1000 1005

Leu Asp Gln Ala Val Pro Leu Pro Met Asp Ile Gln Gln Gly Asp 1010
1015 1020

Ala Ile Ser Ala Asp Lys Pro Pro His Ser Gln Asn Pro Ser Ser 1025
1030 1035

Gln Val Asp Val Gly Gly Gly Trp Lys Ser Phe Met Leu Ser Gly 1040
1045 1050

Thr Arg Phe Ala Gly Ser Val Ser Gln Arg Leu Thr Thr Trp Val 1055
1060 1065

Phe Glu Val Leu Ser His Leu Pro Ala Phe Met Leu Thr Leu Phe 1070
1075 1080

Ser Pro Arg Gly Ser Met Ala Pro Gly Asp Trp Leu Phe Ala Gly 1085
1090 1095

Ala Val Leu Leu Ala Leu Leu Leu Cys Arg Ser Tyr Pro Ile Leu 1100
1105 1110

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Gly Cys  Leu Pro Leu Leu Gly  Val Phe Ser Gly Ser  Val Arg Cys     1115
       1120                 1125

Val Arg  Leu Gly Val Phe Gly  Ser Trp Met Ala Phe  Ala Val Phe     1130
       1135                 1140

Leu Phe  Ser Thr Pro Pro Asp  Pro Val Gly Ser Ser  Cys Asp His     1145
       1150                 1155

Asp Ser  Pro Glu Cys His Ala  Glu Leu Leu Ala Leu  Glu Gln Arg     1160
       1165                 1170

Gln Leu  Trp Glu Pro Val Arg  Ser Leu Val Val Gly  Pro Ser Gly     1175
       1180                 1185

Leu Leu  Cys Val Ile Leu Gly  Lys Leu Leu Gly Gly  Ser Arg Cys     1190
       1195                 1200

Leu Trp  Phe Val Leu Leu Arg  Ile Cys Met Leu Ala  Asp Leu Ala     1205
       1210                 1215

Ile Ser  Leu Ile Tyr Val Val  Ser Gln Gly Arg Cys  His Lys Cys     1220
       1225                 1230

Trp Gly  Lys Cys Ile Arg Thr  Ala Pro Ala Glu Val  Ala Leu Asn     1235
       1240                 1245

Val Phe  Pro Phe Ser Arg Ala  Thr Arg Ser Ser Leu  Val Ser Leu     1250
       1255                 1260

Cys Asp  Arg Phe Gln Ala Pro  Lys Gly Val Asp Pro  Val His Leu     1265
       1270                 1275

Ala Thr  Gly Trp Arg Gly Cys  Trp Cys Gly Glu Ser  Pro Ile His     1280
       1285                 1290

Gln Ser  His Gln Lys Pro Ile  Ala Tyr Ala Asn Leu  Asp Glu Lys     1295
       1300                 1305

Lys Ile  Ser Ala Gln Thr Val  Ile Ala Val Pro Tyr  Asp Pro Ser     1310
       1315                 1320
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Gln Ala Ile Lys Cys Leu Lys Val Leu Gln Ala Gly Gly Ala Ile 1325
1330 1335

Val Asp Gln Pro Thr Pro Glu Val Val Arg Val Ser Glu Ile Pro 1340
1345 1350

Phe Ser Ala Pro Phe Phe Pro Lys Val Pro Val Asn Pro Asp Cys 1355
1360 1365

Arg Val Val Val Asp Ser Asp Thr Phe Val Ala Ala Val Arg Cys 1370
1375 1380

Gly Tyr Ser Thr Ala Gln Leu Val Leu Gly Arg Gly Asn Phe Ala 1385
1390 1395

Lys Leu Asn Gln Thr Pro Leu Arg Asn Ser Val Pro Thr Lys Thr 1400
1405 1410

Thr Gly Gly Ala Ser Tyr Thr Leu Ala Val Ala Gln Val Ser Val 1415
1420 1425

Trp Thr Leu Val His Phe Ile Leu Gly Leu Trp Leu Thr Ser Pro 1430
1435 1440

Gln Val Cys Gly Arg Gly Thr Ser Asp Pro Trp Cys Ser Asn Pro 1445
1450 1455

Phe Ser Tyr Pro Thr Tyr Gly Pro Gly Val Val Cys Ser Ser Arg 1460
1465 1470

Leu Cys Val Ser Ala Asp Gly Val Thr Leu Pro Leu Phe Ser Ala 1475
1480 1485

Val Ala His Leu Ser Gly Arg Glu Val Gly Ile Phe Ile Leu Val 1490
1495 1500

Leu Ala Ser Leu Gly Ala Leu Ala His Arg Leu Ala Leu Lys Ala 1505
1510 1515

Asp Met Ser Met Val Phe Leu Ala Phe Cys Ala Tyr Ala Trp Pro 1520

1525 1530

Met Ser Ser Trp Leu Ile Cys Phe Phe Pro Met Leu Leu Arg Trp 1535
1540 1545

Val Thr Leu His Pro Leu Thr Met Leu Trp Val His Ser Phe Leu 1550
1555 1560

Val Phe Cys Leu Pro Ala Ala Gly Val Leu Ser Leu Gly Ile Thr 1565
1570 1575

Gly Leu Leu Trp Ala Val Gly Arg Phe Thr Gln Val Ala Gly Ile 1580
1585 1590

Ile Thr Pro Tyr Asp Ile His Gln Tyr Thr Ser Gly Pro Arg Gly 1595
1600 1605

Ala Ala Ala Val Ala Thr Ala Pro Glu Gly Thr Tyr Met Ala Ala 1610
1615 1620

Val Arg Arg Ala Ala Leu Thr Gly Arg Thr Leu Ile Phe Thr Pro 1625
1630 1635

Ser Ala Val Gly Ser Leu Leu Glu Gly Ala Phe Arg Thr Gln Lys 1640
1645 1650

Pro Cys Leu Asn Thr Val Asn Val Val Gly Ser Ser Leu Gly Ser 1655
1660 1665

Gly Gly Val Phe Thr Ile Asp Gly Arg Arg Val Ile Val Thr Ala 1670
1675 1680

Thr His Val Leu Asn Gly Asn Thr Ala Arg Val Thr Gly Asp Ser 1685
1690 1695

Tyr Asn Arg Met His Thr Phe Asn Thr Asn Gly Asp Tyr Ala Trp 1700
1705 1710

Ser His Ala Asp Asp Trp Gln Gly Val Ala Pro Met Val Lys Ile 1715
1720 1725

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Ala Lys  Gly Tyr Arg Gly Arg  Ala Tyr Trp Gln Thr  Ser Thr Gly     1730
       1735                 1740

Val Glu  Pro Gly Ile Met Gly  Glu Gly Phe Ala Phe  Cys Phe Thr     1745
       1750                 1755

Asn Cys  Gly Asp Ser Gly Ser  Pro Val Ile Ser Glu  Ala Gly Asp     1760
       1765                 1770

Leu Ile  Gly Val His Thr Gly  Ser Asn Lys Leu Gly  Ser Gly Leu     1775
       1780                 1785

Val Thr  Thr Pro Glu Gly Glu  Thr Cys Ser Ile Lys  Glu Thr Arg     1790
       1795                 1800

Leu Ser  Asp Leu Ser Arg His  Phe Ala Gly Pro Ser  Val Pro Leu     1805
       1810                 1815

Gly Asp  Ile Lys Leu Ser Pro  Ala Ile Ile Pro Asp  Val Thr Thr     1820
       1825                 1830

Ile Pro  Ser Asp Leu Ala Ser  Leu Leu Ala Ser Val  Pro Val Met     1835
       1840                 1845

Glu Gly  Gly Leu Ser Thr Val  Gln Leu Leu Cys Val  Phe Phe Leu     1850
       1855                 1860

Leu Trp  Arg Met Met Gly His  Ala Trp Thr Pro Ile  Val Ala Val     1865
       1870                 1875

Gly Phe  Phe Leu Leu Asn Glu  Ile Leu Pro Ala Val  Leu Val Arg     1880
       1885                 1890

Ala Val  Phe Ser Phe Ala Leu  Phe Val Leu Ala Trp  Ala Thr Pro     1895
       1900                 1905

Trp Ser  Ala Gln Val Leu Met  Ile Arg Leu Leu Thr  Ala Ala Leu     1910
       1915                 1920

Asn Arg  Asn Arg Leu Ser Leu  Ala Phe Tyr Ala Phe  Gly Gly Val     1925
       1930                 1935
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Val Gly Leu Ala Thr Glu Ile Gly Thr Phe Ala Gly Gly Trp Pro 1940
1945 1950

Glu Leu Ser Gln Ala Leu Ser Thr Tyr Cys Phe Leu Pro Arg Phe 1955
1960 1965

Leu Ala Val Thr Ser Tyr Val Pro Thr Ile Ile Ile Gly Gly Leu 1970
1975 1980

His Ala Leu Gly Val Ile Leu Trp Leu Phe Lys Tyr Arg Cys Leu 1985
1990 1995

His Asn Met Leu Val Gly Asp Gly Ser Phe Ser Ser Ala Phe Phe 2000
2005 2010

Leu Arg Tyr Phe Ala Glu Gly Asn Leu Arg Lys Gly Val Ser Gln 2015
2020 2025

Ser Cys Gly Met Asn Asn Glu Ser Leu Thr Ala Ala Leu Ala Cys 2030
2035 2040

Lys Leu Ser Gln Ala Asp Leu Asp Phe Leu Ser Ser Leu Thr Asn 2045
2050 2055

Phe Lys Cys Phe Val Ser Ala Ser Asn Met Lys Asn Ala Ala Gly 2060
2065 2070

Gln Tyr Ile Glu Ala Ala Tyr Ala Arg Ala Leu Arg Gln Glu Leu 2075
2080 2085

Ala Ser Leu Val Gln Val Asp Lys Met Lys Gly Val Leu Ala Lys 2090
2095 2100

Leu Glu Ala Phe Ala Glu Thr Ala Thr Pro Ser Leu Asp Thr Gly 2105
2110 2115

Asp Val Ile Val Leu Leu Gly Gln His Pro His Gly Ser Ile Leu 2120
2125 2130

Asp Ile Asn Val Gly Gly Glu Arg Lys Thr Val Ser Val Gln Glu 2135
2140 2145

Thr Arg Cys Leu Gly Gly Ser Lys Phe Ser Val Cys Thr Val Val 2150
2155 2160

Ser Asn Thr Pro Val Asp Thr Leu Thr Gly Ile Pro Leu Gln Thr 2165
2170 2175

Pro Thr Pro Leu Phe Glu Asn Gly Pro Arg His Arg Ser Glu Asp 2180
2185 2190

Asp Asp Leu Lys Val Glu Arg Met Lys Lys His Cys Val Ser Leu 2195
2200 2205

Gly Phe His Lys Ile Asn Gly Lys Val Tyr Cys Lys Ile Trp Asp 2210
2215 2220

Lys Ser Asn Gly Asp Thr Phe Tyr Thr Asp Asp Ser Arg Tyr Thr 2225
2230 2235

Gln Asp His Ala Phe Gln Asp Arg Ser Thr Asp Tyr Arg Asp Arg 2240
2245 2250

Asp Tyr Glu Gly Val Gln Thr Ala Pro Gln Gln Gly Phe Asp Pro 2255
2260 2265

Lys Ser Glu Ala Pro Val Gly Thr Val Val Ile Gly Gly Ile Thr 2270
2275 2280

Tyr Asn Arg His Leu Val Lys Gly Lys Glu Val Leu Val Pro Lys 2285
2290 2295

Pro Asp Asn Cys Leu Glu Ala Ala Arg Leu Ser Leu Glu Gln Ala 2300
2305 2310

Leu Ala Gly Met Gly Gln Thr Cys Asp Leu Thr Ala Thr Glu Val 2315
2320 2325

Glu Lys Leu Lys Arg Ile Ile Ser Gln Leu Gln Gly Leu Thr Thr 2330
2335 2340

Glu Gln Ala Leu Asn Cys 2345

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<211> 1463
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 1B OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 7209...11600

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Gly Gly Leu Val Val Thr Glu Thr Ala Val Lys Ile Val Lys Tyr His 20
25 30

Ser Arg Thr Phe Thr Leu Gly Ser Leu Asp Leu Lys Val Thr Ser Glu 35
40 45

Val Glu Val Lys Lys Ser Thr Glu Gln Gly His Ala Val Val Ala Asn 50
55 60

Leu Cys Ser Gly Val Val Leu Met Arg Pro His Pro Pro Ser Leu Val 65
70 75 80

Asp Val Leu Leu Lys Pro Gly Leu Asp Thr Thr Pro Gly Ile Gln Pro
85 90 95

Gly His Gly Ala Gly Asn Met Gly Val Asn Gly Ser Ile Trp Asp Phe 100
105 110

Glu Thr Ala Pro Thr Lys Val Glu Leu Glu Leu Ser Lys Gln Ile Ile 115
120 125

Gln Ala Cys Glu Val Arg Arg Gly Asp Ala Pro Asn Leu Gln Leu Pro 130
135 140

Tyr Lys Leu Tyr Pro Val Arg Gly Asp Pro Glu Arg Arg Lys Gly Arg 145
150 155 160

Leu Val Asn Thr Arg Phe Gly Asp Leu Pro Tyr Lys Thr Pro Gln Asp

165 170 175

Thr Lys Ser Ala Ile His Ala Ala Cys Cys Leu His Pro Asn Gly Val 180
185 190

Leu Val Ser Asp Gly Lys Ser Thr Leu Gly Thr Thr Leu Gln His Gly 195
200 205

Phe Glu Leu Tyr Val Pro Thr Val Pro Tyr Ser Val Met Glu Tyr Leu 210
215 220

Asp Ser Arg Pro Asp Thr Pro Phe Met Cys Thr Lys His Gly Thr Ser 225
230 235 240

Lys Ala Ala Ala Glu Asp Leu Gln Lys Tyr Asp Leu Ser Thr Gln Gly
245 250 255

Phe Val Leu Pro Gly Val Leu Arg Leu Val Arg Arg Phe Ile Phe Ser 260
265 270

His Val Gly Lys Ala Pro Pro Leu Phe Leu Pro Ser Thr Tyr Pro Ala 275
280 285

Lys Asn Ser Met Ala Gly Val Asn Gly Gln Arg Phe Pro Thr Lys Asp 290
295 300

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

Glu Asn Trp Gln Thr Val Thr Pro Cys Thr Leu Lys Lys Gln Tyr Cys
325 330 335

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

Leu Ala His Arg Ser Ala Leu Ser Gly Val Thr Gln Ala Phe Met Lys 355
360 365

Lys Ala Trp Lys Ser Pro Ile Ala Leu Gly Lys Asn Lys Phe Lys Glu 370
375 380

Leu His Cys Thr Val Ala Gly Arg Cys Leu Glu Ala Asp Leu Ala Ser 385
390 395 400

Cys Asp Arg Ser Thr Pro Ala Ile Val Arg Trp Phe Val Ala Asn Leu
405 410 415

Leu Tyr Glu Leu Ala Gly Cys Glu Glu Tyr Leu Pro Ser Tyr Val Leu 420
425 430

Asn Cys Cys His Asp Leu Val Ala Thr Gln Asp Gly Ala Phe Thr Lys 435
440 445

Arg Gly Gly Leu Ser Ser Gly Asp Pro Val Thr Ser Val Ser Asn Thr 450
455 460

Val Tyr Ser Leu Ile Ile Tyr Ala Gln His Met Val Leu Ser Ala Leu 465
470 475 480

Lys Met Gly His Glu Ile Gly Leu Lys Phe Leu Glu Glu Gln Leu Lys
485 490 495

Phe Glu Asp Leu Leu Glu Ile Gln Pro Met Leu Val Tyr Ser Asp Asp 500
505 510

Leu Val Leu Tyr Ala Glu Arg Pro Thr Phe Pro Asn Tyr His Trp Trp 515
520 525

Val Glu His Leu Asp Leu Met Leu Gly Phe Lys Thr Asp Pro Lys Lys 530
535 540

Thr Val Ile Thr Asp Lys Pro Ser Phe Leu Gly Cys Arg Ile Glu Ala 545
550 555 560

Gly Arg Gln Leu Val Pro Asn Arg Asp Arg Ile Leu Ala Ala Leu Ala
565 570 575

Tyr His Met Lys Ala Gln Asn Ala Ser Glu Tyr Tyr Ala Ser Ala Ala 580
585 590

Ala Ile Leu Met Asp Ser Cys Ala Cys Ile Asp His Asp Pro Glu Trp 595
600 605

Tyr Glu Asp Leu Ile Cys Gly Ile Ala Arg Cys Ala Arg Gln Asp Gly 610
615 620

Tyr Arg Phe Pro Gly Pro Ala Phe Phe Met Ser Met Trp Glu Lys Leu 625
630 635 640

Lys Ser His Asn Glu Gly Lys Lys Cys Arg His Cys Gly Ile Cys Asp
645 650 655

Ala Lys Ala Asp Tyr Ala Ser Ala Cys Gly Leu Asp Leu Cys Leu Phe 660
665 670

His Ser His Phe His Gln His Cys Pro Val Thr Leu Ser Cys Gly His 675
680 685

His Ala Gly Ser Lys Glu Cys Ser Gln Cys Gln Ser Pro Val Gly Ala 690
695 700

Gly Lys Ser Pro Leu Asp Ala Val Leu Lys Gln Ile Pro Tyr Lys Pro 705
710 715 720

Pro Arg Thr Ile Ile Met Lys Val Asp Asn Lys Thr Thr Thr Leu Asp
725 730 735

Pro Gly Arg Tyr Gln Ser Arg Arg Gly Leu Val Ala Val Lys Arg Gly 740
745 750

Ile Ala Gly Asn Glu Val Asp Leu Ser Asp Gly Asp Tyr Gln Val Val 755
760 765

Pro Leu Leu Pro Thr Cys Lys Asp Ile Asn Met Val Lys Val Ala Cys 770
775 780

Asn Val Leu Leu Ser Lys Phe Ile Val Gly Pro Pro Gly Ser Gly Lys 785
790 795 800

Thr Thr Trp Leu Leu Asn Gln Val Gln Asp Asp Asp Val Ile Tyr Thr
805 810 815

Pro Thr His Gln Thr Met Phe Asp Ile Val Ser Ala Leu Lys Val Cys
825 830 820

Arg Tyr Ser Ile Pro Gly Ala Ser Gly Leu Pro Phe Pro Pro Pro Ala
840 845 835

Arg Ser Gly Pro Trp Val Arg Leu Ile Ala Ser Gly His Val Pro Gly
855 860 850

Arg Val Ser Tyr Leu Asp Glu Ala Gly Tyr Cys Asn His Leu Asp Ile
870 875 880 865

Leu Arg Leu Leu Ser Lys Thr Pro Leu Val Cys Leu Gly Asp Leu Gln
885 890 895

Gln Leu His Pro Val Gly Phe Asp Ser Tyr Cys Tyr Val Phe Asp Gln
905 910 900

Met Pro Gln Lys Gln Leu Thr Thr Ile Tyr Arg Phe Gly Pro Asn Ile
920 925 915

Cys Ala Ala Ile Gln Pro Cys Tyr Arg Glu Lys Leu Glu Ser Lys Ala
935 940 930

Arg Asn Thr Arg Val Val Phe Thr Thr Arg Pro Val Ala Phe Gly Gln
950 955 960 945

Val Leu Thr Pro Tyr His Lys Asp Arg Thr Gly Ser Ala Ile Thr Ile
965 970 975

Asp Ser Ser Gln Gly Ala Thr Phe Asp Ile Val Thr Leu His Leu Pro
985 990 980

Ser Pro Lys Ser Leu Asn Lys Ser Arg Ala Leu Val Ala Ile Thr Arg
1000 1005 995

Ala Arg His Gly Leu Phe Ile Tyr Asp Pro His Asp Gln Leu Gln
1015 1020 1010

Glu Phe Phe Asn Leu Thr Pro Glu Arg Thr Asp Cys Asn Leu Ala
1030 1035 1025

Phe Ser Arg Gly Asp Glu Leu Val Val Leu Asn Val Asp Asn Ala 1040
1045 1050

Val Thr Thr Val Ala Lys Ala Leu Glu Thr Gly Ser Pro Arg Phe 1055
1060 1065

Arg Val Ser Asp Pro Arg Cys Lys Ser Leu Leu Ala Ala Cys Ser 1070
1075 1080

Ala Ser Leu Glu Gly Ser Cys Met Pro Leu Pro Gln Val Ala His 1085
1090 1095

Asn Leu Gly Phe Tyr Phe Ser Pro Asp Ser Pro Ala Phe Ala Pro 1100
1105 1110

Leu Pro Lys Glu Leu Ala Pro His Trp Pro Val Val Thr His Gln 1115
1120 1125

Asn Asn Arg Ala Trp Pro Asp Arg Leu Val Ala Ser Met Arg Pro 1130
1135 1140

Ile Asp Ala Arg Tyr Ser Lys Pro Met Val Gly Ala Gly Tyr Val 1145
1150 1155

Val Gly Pro Ser Ile Phe Leu Gly Thr Pro Gly Val Val Ser Tyr 1160
1165 1170

Tyr Leu Thr Leu Tyr Ile Gly Gly Glu Pro Gln Ala Leu Pro Glu 1175
1180 1185

Thr Leu Val Ser Thr Gly Arg Ile Ala Thr Asp Cys Arg Glu Tyr 1190
1195 1200

Leu Asp Ala Ala Glu Glu Glu Ala Ala Arg Glu Leu Pro His Ala 1205
1210 1215

Phe Ile Gly Asp Val Lys Gly Thr Thr Ile Gly Gly Cys His His 1220
1225 1230

Ile Thr Ser Lys Tyr Leu Pro Arg Ser Leu Pro Lys Asp Ser Val 1235

1240 1245

Ala Val Val Gly Val Ser Ser Pro Gly Arg Ala Ala Lys Ala Val 1250
1255 1260

Cys Thr Leu Thr Asp Val Tyr Leu Pro Glu Leu Arg Pro Tyr Leu 1265
1270 1275

Gln Pro Glu Thr Ala Ser Lys Cys Trp Lys Leu Lys Leu Asp Phe 1280
1285 1290

Arg Asp Val Arg Leu Met Val Trp Lys Gly Ala Thr Ala Tyr Phe 1295
1300 1305

Gln Leu Glu Gly Leu Thr Trp Ser Ala Leu Pro Asp Tyr Ala Arg 1310
1315 1320

Phe Ile Gln Leu Pro Lys Asp Ala Val Val Tyr Ile Asp Pro Cys 1325
1330 1335

Ile Gly Pro Ala Thr Ala Asn Arg Lys Val Val Arg Thr Thr Asp 1340
1345 1350

Trp Arg Ala Asp Leu Ala Val Thr Pro Tyr Asp Tyr Gly Ala Gln 1355
1360 1365

Val Ile Leu Thr Thr Ala Trp Phe Glu Asp Leu Gly Pro Gln Trp 1370
1375 1380

Lys Ile Leu Gly Leu Gln Pro Phe Arg Arg Thr Phe Gly Phe Glu 1385
1390 1395

Asn Thr Glu Asp Trp Ala Ile Leu Ala Arg Arg Met Asn Asp Gly 1400
1405 1410

Lys Asp Tyr Thr Asp Tyr Asn Trp His Cys Val Arg Glu Arg Pro 1415
1420 1425

His Ala Ile Tyr Gly Arg Ala Arg Asp His Thr Tyr His Phe Ala 1430
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Leu Gly Thr Glu Leu Gln Val Glu Leu Gly Arg Pro Arg Leu Pro 1445
1450 1455

Pro Glu Gln Val Pro 1460

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<211> 249
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 2 OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 11611..12360

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Pro Ser Leu Ser Ser Leu Leu Val Trp Leu Thr Leu Ser Ser Phe Ser 20
25 30

Pro Tyr Cys Leu Gly Ser Leu Leu Gln Ala Gly Tyr Trp Ser Ser Phe 35
40 45

Ser Glu Trp Phe Ala Pro Arg Phe Ser Val Arg Ala Leu Pro Phe Thr 50
55 60

Leu Pro Asn Tyr Arg Arg Ser Tyr Glu Gly Leu Leu Pro Asn Cys Arg 65
70 75 80

Pro Asp Val Pro Gln Phe Ala Val Lys His Pro Leu Gly Ile Leu Trp
85 90 95

His Met Arg Val Ser His Leu Ile Asp Glu Met Val Ser Arg Arg Ile 100
105 110

Tyr Arg Thr Met Glu His Ser Gly Gln Ala Ala Trp Lys Gln Val Val 115
120 125

Ser Glu Ala Thr Leu Thr Lys Leu Ser Arg Leu Asp Val Val Thr His 130
135 140

Phe Gln His Leu Ala Ala Val Glu Ala Asp Ser Cys Arg Phe Leu Ser 145
150 155 160

Ser Arg Leu Ala Met Leu Lys Asn Leu Ala Val Gly Asn Val Ser Leu
165 170 175

Glu Tyr Asn Thr Thr Leu Asp Arg Val Glu Leu Ile Phe Pro Thr Pro 180
185 190

Gly Thr Arg Pro Lys Leu Thr Asp Phe Arg Gln Trp Leu Ile Ser Val 195
200 205

His Ala Ser Ile Phe Ser Ser Val Ala Ser Ser Val Thr Leu Phe Thr 210
215 220

Val Leu Trp Leu Arg Ile Pro Ala Leu Arg Tyr Val Phe Gly Phe His 225
230 235 240

Trp Pro Thr Ala Thr His His Ser Asn 245

<210> 5
<211> 265
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 3 OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 12219..13016

<400> 5

Met Ala Tyr Gln Arg Ala Arg Phe His Leu Leu Leu Cys Gly Phe Val 1
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Cys Tyr Leu Val His Ser Ala Leu Ala Ser Asn Ser Ser Ser Thr Leu 20
25 30

Cys Phe Trp Phe Pro Leu Ala His Gly Asn Thr Ser Phe Glu Leu Thr 35
40 45

Ile Asn Tyr Thr Ile Cys Lys Pro Cys Pro Thr Ser Gln Ala Ala Gln 50
55 60

Gln Arg Leu Glu Pro Gly Arg Asn Val Trp Cys Lys Ile Gly His Asp 65
70 75 80

Arg Cys Glu Glu Arg Asp His Asp Glu Leu Ser Met Ser Ile Pro Ser
85 90 95

Gly Tyr Asp Asn Leu Lys Leu Glu Gly Tyr Tyr Ala Trp Leu Ala Phe 100
105 110

Leu Ser Phe Ser Tyr Ala Ala Gln Phe His Pro Glu Leu Phe Gly Ile 115
120 125

Gly Asn Val Ser Arg Val Phe Val Asp Lys Arg His Gln Phe Ile Cys 130
135 140

Ala Glu His Asp Gly Gln Asn Ser Thr Ile Ser Ala Arg His Asn Ile 145
150 155 160

Ser Ala Ser Tyr Ala Val Tyr Tyr His His Gln Ile Asp Gly Gly Asn
165 170 175

Trp Phe His Leu Glu Trp Leu Arg Pro Phe Phe Ser Ser Trp Leu Val 180
185 190

Leu Asn Ile Ser Trp Phe Leu Arg Arg Ser Pro Ala Ser Pro Ala Ser 195
200 205

Arg Arg Ile Tyr Gln Ile Leu Arg Pro Thr Arg Pro Arg Leu Pro Val 210
215 220

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

Gln Arg Lys Val Pro Leu Pro Ser Gly Gly Arg Pro Asn Val Val Lys
245 250 255

Pro Ser Ala Phe Pro Ser Thr Ser Arg 260 265

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<211> 183
<212> PRT
<213> Artificial Sequence

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<223> ORF 4 OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 12761..13312

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Val Ser Glu Ala Phe Ala Cys Lys Pro Cys Phe Ser Thr His Leu Ser 20
25 30

Asp Ile Lys Thr Asn Thr Thr Ala Ala Ala Gly Phe Met Val Leu Gln 35
40 45

Asn Ile Asn Cys Phe Gln Ser His Arg Ala Ser Thr Ala Gln Gly Thr 50
55 60

Thr Pro Leu Arg Arg Ser Ser Gln Cys Arg Glu Ala Val Gly Ile Pro 65
70 75 80

Gln Tyr Ile Thr Ile Thr Ala Asn Val Thr Asp Glu Ser Tyr Leu Tyr
85 90 95

Asn Ala Asp Leu Leu Met Leu Ser Ala Cys Leu Phe Tyr Ala Ser Glu 100
105 110

Met Ser Glu Lys Gly Phe Lys Val Ile Phe Gly Asn Ile Ser Gly Val 115
120 125

Val Ser Ala Cys Val Asn Phe Thr Asp Tyr Val Ala His Val Thr Gln 130
135 140

His Thr Gln Gln His His Leu Val Ile Asp His Ile Arg Leu Leu His 145
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Phe Leu Thr Pro Ser Thr Met Arg Trp Ala Thr Thr Ile Ala Cys Leu
165 170 175

Leu Ala Ile Leu Leu Ala Val 180

<210> 7
<211> 201
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 5 OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN

NUCLEOTIDES 13309..13914

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25 30

Asp Gly Asn Asp Asp Ser Ser Thr Ser Gln Tyr Ile Tyr Asn Leu Thr 35
40 45

Ile Cys Glu Leu Asn Gly Thr Glu Trp Leu Ser Gly His Phe Asp Trp 50
55 60

Ala Val Glu Thr Phe Val Leu Tyr Pro Val Ala Thr His Ile Ile Ser 65
70 75 80

Leu Gly Phe Leu Thr Thr Ser His Phe Leu Asp Ala Leu Gly Leu Gly
85 90 95

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

Met Tyr Gly Val Cys Ala Phe Ala Ala Phe Val Cys Phe Val Ile Arg 115
120 125

Ala Ala Lys Asn Cys Met Ala Cys Arg Tyr Ala Arg Thr Arg Phe Thr 130
135 140

Asn Phe Ile Val Asp Asp Arg Gly Arg Ile His Arg Trp Lys Ser Ser 145
150 155 160

Ile Val Val Glu Lys Leu Gly Lys Ala Glu Val Gly Gly Asp Leu Val
165 170 175

Asn Ile Lys His Val Val Leu Glu Gly Val Lys Ala Gln Pro Leu Thr 180
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Arg Thr Ser Ala Glu Gln Trp Glu Ala 195 200

<210> 8
<211> 173
<212> PRT
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<220>
<223> ORF 6 OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 13902..14423

<400> 8

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Leu Val Leu Ala Phe Ser Ile Thr Tyr Thr Pro Ile Met Ile Tyr Ala 20
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Leu Lys Val Ser Arg Gly Arg Leu Leu Gly Leu Leu His Ile Leu Ile 35
40 45

Phe Leu Asn Cys Ser Phe Thr Phe Gly Tyr Met Thr Tyr Val His Phe 50
55 60

Gln Ser Thr Asn Arg Val Ala Phe Thr Leu Gly Ala Val Val Ala Leu 65
70 75 80

Leu Trp Gly Val Tyr Ser Leu Thr Glu Ser Trp Lys Phe Ile Thr Ser
85 90 95

Arg Cys Arg Leu Cys Cys Leu Gly Arg Arg Tyr Ile Leu Ala Pro Ala 100
105 110

His His Val Glu Ser Ala Ala Gly Leu His Ser Ile Pro Ala Ser Gly 115
120 125

Asn Arg Ala Tyr Ala Val Arg Lys Pro Gly Leu Thr Ser Val Asn Gly 130
135 140

Thr Leu Val Pro Gly Leu Arg Ser Leu Val Leu Gly Gly Lys Arg Ala 145
150 155 160

Val Lys Arg Gly Val Val Asn Leu Val Lys Tyr Gly Arg 165
170

<210> 9
<211> 128

<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 7 OF 94881 MSV ENCODED BY SEQUENCE OF SEQ ID NO:1 BETWEEN NUCLEOTIDES 14413..14799

<400> 9

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Met Gly Lys Gly Gln Pro Val Asn Gln Leu Cys Gln Leu Leu Gly Thr 20
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Met Ile Lys Ser Gln Arg Gln Gln Ser Arg Gly Gly Gln Ala Lys Lys 35
40 45

Lys Lys Pro Glu Lys Pro His Phe Pro Leu Ala Ala Glu Asp Asp Ile 50
55 60

Arg His His Leu Thr Gln Ala Glu Arg Ser Leu Cys Leu Gln Ser Ile 65
70 75 80

Gln Thr Ala Phe Asn Gln Gly Ala Gly Thr Ala Ser Leu Ser Ser Ser
85 90 95

Gly Lys Val Ser Phe Gln Val Glu Phe Met Leu Pro Val Ala His Thr 100
105 110

Val Arg Leu Ile Arg Val Thr Ser Thr Ser Ala Ser Gln Gly Ala Asn 115
120 125

<210> 10
<211> 14843
<212> DNA
<213> Porcine Reproductive Respiratory Syndrome Virus

<400> 10
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<400> 11

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Leu Phe His Lys Pro Lys Asp Lys Leu His Trp Lys Val Pro Ile Gly 50
55 60

Ile Pro Gln Val Glu Cys Ser Pro Ser Gly Cys Cys Trp Leu Ser Thr 65
70 75 80

Ile Phe Pro Leu Ala Arg Met Thr Ser Gly Asn His Asn Phe Leu Gln
85 90 95

Arg Leu Val Lys Val Ala Asp Val Leu Tyr Arg Asp Gly Cys Leu Thr 100
105 110

Pro Arg His Leu Arg Glu Leu Gln Val Tyr Glu Arg Gly Cys Asn Trp 115
120 125

Tyr Pro Ile Thr Gly Pro Val Pro Gly Met Ala Val Tyr Ala Asn Ser 130
135 140

Met His Val Ser Asp Gln Pro Phe Pro Gly Ala Thr His Val Leu Thr 145
150 155 160

Asn Ser Pro Leu Pro Gln Arg Ala Cys Arg Gln Pro Phe Cys Pro Phe
165 170 175

Glu Glu Ala His Ser Ser Ile Tyr Arg Trp Glu Lys Phe Val Ile Phe
185 190 180

Met Asp Ser Ser Ser Asp Gly Arg Ser Arg Met Met Trp Thr Pro Glu
200 205 195

Ser Asp Asp Ser Thr Ala Leu Glu Val Leu Pro Pro Glu Leu Glu His
215 220 210

Gln Val Lys Val Leu Val Arg Ser Phe Pro Ala His His Leu Val Asp
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Leu Ala Asp Trp Glu Leu Thr Glu Ser Pro Glu Asn Gly Phe Ser Phe
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Ser Thr Ser His Pro Cys Gly Tyr Leu Val Arg Asp Pro Ala Val Ser
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Glu Gly Lys Cys Trp Leu Ser Cys Phe Leu Ser Gln Ser Ala Glu Val
280 285 275

Leu Ser Arg Glu Ala His Leu Ala Thr Ala Tyr Gly Tyr Gln Thr Lys
295 300 290

Trp Gly Val Pro Gly Lys Tyr Ile Gln Arg Arg Leu Gln Val His Gly
310 315 320 305

Leu Arg Ala Val Val Asp Pro Asp Gly Pro Ile His Val Glu Ala Leu
325 330 335

Ser Cys Pro Gln Ser Trp Ile Arg His Leu Thr Leu Asn Asp Asp Val
345 350 340

Thr Pro Gly Phe Val Arg Leu Met Ser Leu Arg Ile Val Pro Asn Thr
360 365 355

Glu Pro Thr Thr His Arg Ile Phe Arg Phe Gly Val His Lys Trp Tyr
375 380 370

Gly Ala Ala Gly Lys Arg Ala Arg Gly Lys Arg Ala Ala Lys Ser Glu 385

390 395 400

Lys Asp Ser Ala Ser Thr Leu Lys Val Ala Arg Pro Thr Ser Thr Ser
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Gly Ile Val Thr Tyr Ser Pro Pro Ala Asp Gly Ser Cys Gly Trp His
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Ala Leu Ala Ala Ile Leu Asn Arg Met Ile Asn Asn Asp Phe Thr Ser
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Pro Leu Pro Arg Tyr Asn Arg Pro Glu Asp Asp Trp Ala Ser Asp Gly
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Asp Leu Ala Gln Ala Ile Gln Cys Leu Gln Leu Pro Ala Ala Ile Ala
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Arg Asn Arg Ala Cys Pro Asn Ala Lys Tyr Leu Val Lys Leu Asn Gly
485 490 495

Val His Trp Glu Val Glu Val Arg Pro Gly Met Ala Pro Arg Ser Leu
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Ser Arg Glu Cys Val Val Gly Val Cys Ser Glu Gly Cys Val Ala Ser
515 520 525

Pro Tyr Pro Glu Asp Gly Leu Pro Lys Arg Ala Leu Glu Ala Leu Ala
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Ser Ala Tyr Arg Leu Pro Ser Asp Cys Val Cys Asp Gly Ile Ile Asp
545 550 555 560

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565 570 575

Leu Thr Ser Pro Ser Pro Glu Gln Ser Gly Phe Ser Ser Leu Tyr Lys
580 585 590

Leu Leu Leu Glu Val Leu Pro Gln Lys Cys Gly Ser Thr Glu Gly Glu
595 600 605

Phe Ile Tyr Thr Val Glu Arg Met Leu Lys Asp Cys Pro Ser Ser Lys 610
615 620

Gln Ala Met Ala Leu Leu Ala Lys Ile Lys Val Pro Ser Ser Lys Ala 625
630 635 640

Pro Ser Val Thr Leu Asn Glu Cys Phe Pro Thr Asp Val Pro Val Asn
645 650 655

Ser Glu Leu Ile Ser Trp Glu Glu Pro Lys Asp Pro Gly Ala Ala Val 660
665 670

Val Leu Cys Pro Ser Asp Ala Lys Glu Ser Lys Glu Thr Ala Pro Glu 675
680 685

Glu Ala Gln Ala Arg Asn Arg Lys Val Leu His Pro Val Val Leu Thr 690
695 700

Glu Glu Leu Ser Glu Gln Gln Val Gln Val Val Glu Gly Asp Gln Asp 705
710 715 720

Met Pro Leu Asp Leu Thr Trp Pro Thr Leu Thr Ala Thr Ala Thr Pro
725 730 735

Val Arg Gly Pro Val Pro Asp Asn Leu Ser Ser Gly Ile Gly Ala Gln 740
745 750

Pro Ala Thr Val Gln Glu Leu Ile Leu Ala Arg Pro Ala Pro Arg Leu 755
760 765

Val Glu Arg Cys Gly Thr Glu Ser Asn Gly Ser Ser Ser Phe Leu Asp 770
775 780

Leu Pro Asp Val Gln Thr Ser Asp Gln Pro Leu Asp Leu Ser Leu Ala 785
790 795 800

Ala Trp Pro Val Arg Ala Thr Ala Ser Asp Pro Gly Trp Ile His Gly
805 810 815

Arg Arg Glu Pro Val Phe Val Lys Pro Arg Gly Val Phe Ser Asp Gly 820
825 830

Glu Ser Ala Leu Gln Phe Gly Glu Leu Ser Glu Ala Ser Ser Val Val 835
840 845

Asp Asp Arg Thr Lys Glu Ala Pro Val Val Asp Ala Pro Ile Asp Leu 850
855 860

Thr Thr Ser Asn Glu Thr Leu Ser Gly Ser Asp Pro Phe Glu Phe Ala 865
870 875 880

Lys Phe Arg Arg Pro Arg Phe Ser Ala Gln Ala Leu Ile Asp Arg Gly
885 890 895

Gly Pro Leu Ala Asp Val His Ala Lys Ile Lys Ser Arg Val Tyr Glu 900
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Gln Cys Leu Gln Ala Cys Glu Pro Gly Ser Arg Ala Thr Pro Ala Thr 915
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Lys Lys Trp Leu Asp Lys Met Trp Asp Arg Val Asp Met Lys Thr Trp 930
935 940

Arg Cys Thr Ser Gln Phe Gln Ala Gly His Ile Leu Glu Ser Leu Lys 945
950 955 960

Phe Leu Pro Asp Met Ile Gln Asp Thr Pro Pro Pro Val Pro Arg Lys
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Asn Arg Ala Gly Asp Ser Ala Gly Leu Lys Gln Leu Val Ala Gln Trp 980
985 990

Asp Arg Lys Leu Ser Val Thr Pro Pro Thr Lys Pro Val Gly Pro Val 995
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Ala Ile Ser Ala Asp Lys Pro Pro His Ser Gln Asn Pro Ser Ser 1025
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Thr Arg Phe Ala Gly Ser Val Ser Gln Arg Leu Thr Thr Trp Val 1055
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Phe Glu Val Leu Ser His Leu Pro Ala Phe Met Leu Thr Leu Phe 1070
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Ser Pro Arg Gly Ser Met Ala Pro Gly Asp Trp Leu Phe Ala Gly 1085
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Ala Val Leu Leu Ala Leu Leu Leu Cys Arg Ser Tyr Pro Ile Leu 1100
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Gly Cys Leu Pro Leu Leu Gly Val Phe Ser Gly Ser Val Arg Cys 1115
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Val Arg Leu Gly Val Phe Gly Ser Trp Met Ala Phe Ala Val Phe 1130
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Asp Ser Pro Glu Cys His Ala Glu Leu Leu Ala Leu Glu Gln Arg 1160
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Gln Leu Trp Glu Pro Val Arg Ser Leu Val Val Gly Pro Ser Gly 1175
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Leu Leu Cys Val Ile Leu Gly Lys Leu Leu Gly Gly Ser Arg Cys 1190
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Leu Trp Phe Val Leu Leu Arg Ile Cys Met Leu Ala Asp Leu Ala 1205
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Ile Ser Leu Ile Tyr Val Val Ser Gln Gly Arg Cys His Lys Cys 1220
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Trp Gly Lys Cys Ile Arg Thr Ala Pro Ala Glu Val Thr Leu Asn 1235
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Val Phe Pro Phe Ser Arg Ala Thr Arg Ser Ser Leu Val Ser Leu 1250
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Cys Asp Arg Phe Gln Ala Pro Lys Gly Val Asp Pro Val His Leu 1265
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Ala Thr Gly Trp Arg Gly Cys Trp Cys Gly Glu Ser Pro Ile His 1280
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Gln Ala Ile Lys Cys Leu Lys Val Leu Gln Ala Gly Gly Ala Ile 1325
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Val Asp Gln Pro Thr Pro Glu Val Val Arg Val Ser Glu Ile Pro 1340
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Arg Val Val Val Asp Ser Asp Thr Phe Val Ala Ala Val Arg Cys 1370
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Gly Tyr Ser Thr Ala Gln Leu Val Leu Gly Arg Gly Asn Phe Ala 1385
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Lys Leu Asn Gln Thr Pro Leu Arg Asn Ser Val Pro Thr Lys Thr 1400
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Thr Gly Gly Ala Ser Tyr Thr Leu Ala Val Ala Gln Val Ser Val 1415
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Gln Val Cys Gly Arg Gly Thr Ser Asp Pro Trp Cys Ser Asn Pro 1445

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Phe Ser Tyr Pro Thr Tyr Gly Pro Gly Val Val Cys Ser Ser Arg 1460
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Val Arg Arg Ala Ala Leu Thr Gly Arg Thr Leu Ile Phe Thr Pro 1625
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Tyr Asn Arg Met His Thr Phe Asn Thr Asn Gly Asp Tyr Ala Trp 1700
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Ser His Ala Asp Asp Trp Gln Gly Val Ala Pro Met Val Lys Ile 1715
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Ala Lys Gly Tyr Arg Gly Arg Ala Tyr Trp Gln Thr Ser Thr Gly 1730
1735 1740

Val Glu Pro Gly Ile Met Gly Glu Gly Phe Ala Phe Cys Phe Thr 1745
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Asn Cys Gly Asp Ser Gly Ser Pro Val Ile Ser Glu Ala Gly Asp 1760
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Leu Ile Gly Val His Thr Gly Ser Asn Lys Leu Gly Ser Gly Leu 1775
1780 1785

Val Thr Thr Pro Glu Gly Glu Thr Cys Ser Ile Lys Glu Thr Arg 1790
1795 1800

Leu Ser Asp Leu Ser Arg His Phe Ala Gly Pro Ser Val Pro Leu 1805
1810 1815

Gly Asp Ile Lys Leu Ser Pro Ala Ile Ile Pro Asp Val Thr Thr 1820
1825 1830

Ile Pro Ser Asp Leu Ala Ser Leu Leu Ala Ser Val Pro Val Met 1835
1840 1845

Glu Gly Gly Leu Ser Thr Val Gln Leu Leu Cys Val Phe Phe Leu 1850
1855 1860

Leu Trp Arg Met Met Gly His Ala Trp Thr Pro Ile Val Ala Val 1865
1870 1875

Gly Phe Phe Leu Leu Asn Glu Ile Leu Pro Ala Val Leu Val Arg 1880
1885 1890

Ala Val Phe Ser Phe Ala Leu Phe Val Leu Ala Trp Ala Thr Pro 1895
1900 1905

Trp Ser Ala Gln Val Leu Met Ile Arg Leu Leu Thr Ala Ala Leu 1910
1915 1920

Asn Arg Asn Arg Leu Ser Leu Ala Phe Tyr Ala Leu Gly Gly Val 1925
1930 1935

Val Gly Leu Ala Thr Glu Ile Gly Thr Phe Ala Gly Gly Trp Pro 1940
1945 1950

Glu Leu Ser Gln Ala Leu Ser Thr Tyr Cys Phe Leu Pro Arg Phe 1955
1960 1965

Leu Ala Val Thr Ser Tyr Val Pro Thr Ile Ile Ile Gly Gly Leu 1970
1975 1980

His Ala Leu Gly Val Ile Leu Trp Leu Phe Lys Tyr Arg Cys Leu 1985
1990 1995

His Asn Met Leu Val Gly Asp Gly Ser Phe Ser Ser Ala Phe Phe 2000
2005 2010

Leu Arg Tyr Phe Ala Glu Gly Asn Leu Arg Lys Gly Val Ser Gln 2015
2020 2025

Ser Cys Gly Met Asn Asn Glu Ser Leu Thr Ala Ala Leu Ala Cys 2030
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Lys Leu Ser Gln Ala Asp Leu Asp Phe Leu Ser Ser Leu Thr Asn 2045
2050 2055

Phe Lys Cys Phe Val Ser Ala Ser Asn Met Lys Asn Ala Ala Gly 2060
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Gln Tyr Ile Glu Ala Ala Tyr Ala Arg Ala Leu Arg Gln Glu Leu 2075
2080 2085

Ala Ser Leu Val Gln Val Asp Lys Met Lys Gly Val Leu Ala Lys 2090
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Leu Glu Ala Phe Ala Glu Thr Ala Thr Pro Ser Leu Asp Thr Gly 2105
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Asp Ile Asn Val Gly Gly Glu Arg Lys Thr Val Ser Val Gln Glu 2135
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Asp Asp Leu Lys Val Glu Arg Met Lys Lys His Cys Val Ser Leu 2195
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Tyr Asn Arg His Leu Val Lys Gly Lys Glu Val Leu Val Pro Lys 2285
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Glu Gln Ala Leu Asn Cys 2345

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<213> Porcine Reproductive Respiratory Syndrome Virus

<400> 12

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Val Glu Val Lys Lys Ser Thr Glu Gln Gly His Ala Val Val Ala Asn 50
55 60

Leu Cys Ser Gly Val Val Leu Met Arg Pro His Pro Pro Ser Leu Val 65
70 75 80

Asp Val Leu Leu Lys Pro Gly Leu Asp Thr Thr Pro Gly Ile Gln Pro
85 90 95

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Gly His Gly Ala Gly Asn Met Gly Val Asn Gly Ser Ile Trp Asp Phe
                105                 110                 100

Glu Thr Ala Pro Thr Lys Val Glu Leu Glu Leu Ser Lys Gln Ile Ile
            120                 125                 115

Gln Ala Cys Glu Val Arg Arg Gly Asp Ala Pro Asn Leu Gln Leu Pro
        135                 140                 130

Tyr Lys Leu Tyr Pro Val Arg Gly Asp Pro Glu Arg Arg Lys Gly Arg
    150                 155                 160                 145

Leu Val Asn Thr Arg Phe Gly Asp Leu Pro Tyr Lys Thr Pro Gln Asp
165                 170                 175

Thr Lys Ser Ala Ile His Ala Ala Cys Cys Leu His Pro Asn Gly Val
                185                 190                 180

Leu Val Ser Asp Gly Lys Ser Thr Leu Gly Thr Thr Leu Gln His Gly
            200                 205                 195

Phe Glu Leu Tyr Val Pro Thr Val Pro Tyr Ser Val Met Glu Tyr Leu
        215                 220                 210

Asp Ser Arg Pro Asp Thr Pro Phe Met Cys Thr Lys His Gly Thr Ser
    230                 235                 240                 225

Lys Ala Ala Ala Glu Asp Leu Gln Lys Tyr Asp Leu Ser Thr Gln Gly
245                 250                 255

Phe Val Leu Pro Gly Val Leu Arg Leu Val Arg Arg Phe Ile Phe Ser
                265                 270                 260

His Val Gly Lys Ala Pro Pro Leu Phe Leu Pro Ser Thr Tyr Pro Ala
            280                 285                 275

Lys Asn Ser Met Ala Gly Val Asn Gly Gln Arg Phe Pro Thr Lys Asp
        295                 300                 290

Val Gln Ser Ile Pro Glu Ile Asp Glu Met Cys Ala Arg Ala Val Lys
    310                 315                 320                 305
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Glu Asn Trp Gln Thr Val Thr Pro Cys Thr Leu Lys Lys Gln Tyr Cys
325 330 335

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

Leu Ala His Arg Ser Ala Leu Ser Gly Val Thr Gln Ala Phe Met Lys 355
360 365

Lys Ala Trp Lys Ser Pro Ile Ala Leu Gly Lys Asn Lys Phe Lys Glu 370
375 380

Leu His Cys Thr Val Ala Gly Arg Cys Leu Glu Ala Asp Leu Ala Ser 385
390 395 400

Cys Asp Arg Ser Thr Pro Ala Ile Val Arg Trp Phe Val Ala Asn Leu
405 410 415

Leu Tyr Glu Leu Ala Gly Cys Glu Glu Tyr Leu Pro Ser Tyr Val Leu 420
425 430

Asn Cys Cys His Asp Leu Val Ala Thr Gln Asp Gly Ala Phe Thr Lys 435
440 445

Arg Gly Gly Leu Ser Ser Gly Asp Pro Val Thr Ser Val Ser Asn Thr 450
455 460

Val Tyr Ser Leu Ile Ile Tyr Ala Gln His Met Val Leu Ser Ala Leu 465
470 475 480

Lys Met Gly His Glu Ile Gly Leu Lys Phe Leu Glu Glu Gln Leu Lys
485 490 495

Phe Glu Asp Leu Leu Glu Ile Gln Pro Met Leu Val Tyr Ser Asp Asp 500
505 510

Leu Val Leu Tyr Ala Glu Arg Pro Thr Phe Pro Asn Tyr His Trp Trp 515
520 525

Val Glu His Leu Asp Leu Met Leu Gly Phe Lys Thr Asp Pro Lys Lys 530

535 540

Thr Val Ile Thr Asp Lys Pro Ser Phe Leu Gly Cys Arg Ile Glu Ala 545
550 555 560

Gly Arg Gln Leu Val Pro Asn Arg Asp Arg Ile Leu Ala Ala Leu Ala
565 570 575

Tyr His Met Lys Ala Gln Asn Ala Ser Glu Tyr Tyr Ala Ser Ala Ala 580
585 590

Ala Ile Leu Met Asp Ser Cys Ala Cys Ile Asp His Asp Pro Glu Trp 595
600 605

Tyr Glu Asp Leu Ile Cys Gly Ile Ala Arg Cys Ala Arg Gln Asp Gly 610
615 620

Tyr Arg Phe Pro Gly Pro Ala Phe Phe Met Ser Met Trp Glu Lys Leu 625
630 635 640

Lys Ser His Asn Glu Gly Lys Lys Cys Arg His Cys Gly Ile Cys Asp
645 650 655

Ala Lys Ala Asp Tyr Ala Ser Ala Cys Gly Leu Asp Leu Cys Leu Phe 660
665 670

His Ser His Phe His Gln His Cys Pro Val Thr Leu Ser Cys Gly His 675
680 685

His Ala Gly Ser Lys Glu Cys Ser Gln Cys Gln Ser Pro Val Gly Ala 690
695 700

Gly Lys Ser Pro Leu Asp Ala Val Leu Lys Gln Ile Pro Tyr Lys Pro 705
710 715 720

Pro Arg Thr Ile Ile Met Lys Val Asp Asn Lys Thr Thr Thr Leu Asp
725 730 735

Pro Gly Arg Tyr Gln Ser Arg Arg Gly Leu Val Ala Val Lys Arg Gly 740
745 750

Ile Ala Gly Asn Glu Val Asp Leu Ser Asp Gly Asp Tyr Gln Val Val
760 765 755

Pro Leu Leu Pro Thr Cys Lys Asp Ile Asn Met Val Lys Val Ala Cys
775 780 770

Asn Val Leu Leu Ser Lys Phe Ile Val Gly Pro Pro Gly Ser Gly Lys
790 795 800 785

Thr Thr Trp Leu Leu Asn Gln Val Gln Asp Asp Asp Val Ile Tyr Thr
805 810 815

Pro Thr His Gln Thr Met Phe Asp Ile Val Ser Ala Leu Lys Val Cys
825 830 820

Arg Tyr Ser Ile Pro Gly Ala Ser Gly Leu Pro Phe Pro Pro Pro Ala
840 845 835

Arg Ser Gly Pro Trp Val Arg Leu Ile Ala Ser Gly His Val Pro Gly
855 860 850

Arg Val Ser Tyr Leu Asp Glu Ala Gly Tyr Cys Asn His Leu Asp Ile
870 875 880 865

Leu Arg Leu Leu Ser Lys Thr Pro Leu Val Cys Leu Gly Asp Leu Gln
885 890 895

Gln Leu His Pro Val Gly Phe Asp Ser Tyr Cys Tyr Val Phe Asp Gln
905 910 900

Met Pro Gln Lys Gln Leu Thr Thr Ile Tyr Arg Phe Gly Pro Asn Ile
920 925 915

Cys Ala Ala Ile Gln Pro Cys Tyr Arg Glu Lys Leu Glu Ser Lys Ala
935 940 930

Arg Asn Thr Arg Val Val Phe Thr Thr Arg Pro Val Ala Phe Gly Gln
950 955 960 945

Val Leu Thr Pro Tyr His Lys Asp Arg Thr Gly Ser Ala Ile Thr Ile
965 970 975

Asp Ser Ser Gln Gly Ala Thr Phe Asp Ile Val Thr Leu His Leu Pro 980
985 990

Ser Pro Lys Ser Leu Asn Lys Ser Arg Ala Leu Val Ala Ile Thr Arg 995
1000 1005

Ala Arg His Gly Leu Phe Ile Tyr Asp Pro His Asp Gln Leu Gln 1010
1015 1020

Glu Phe Phe Asn Leu Thr Pro Glu Arg Thr Asp Cys Asn Leu Ala 1025
1030 1035

Phe Ser Arg Gly Asp Glu Leu Val Val Leu Asn Val Asp Asn Ala 1040
1045 1050

Val Thr Thr Val Ala Lys Ala Leu Glu Thr Gly Ser Pro Arg Phe 1055
1060 1065

Arg Val Ser Asp Pro Arg Cys Lys Ser Leu Leu Ala Ala Cys Ser 1070
1075 1080

Ala Ser Leu Glu Gly Ser Cys Met Pro Leu Pro Gln Val Ala His 1085
1090 1095

Asn Leu Gly Phe Tyr Phe Ser Pro Asp Ser Pro Ala Phe Ala Pro 1100
1105 1110

Leu Pro Lys Glu Leu Ala Pro His Trp Pro Val Val Thr His Gln 1115
1120 1125

Asn Asn Arg Ala Trp Pro Asp Arg Leu Val Ala Ser Met Arg Pro 1130
1135 1140

Ile Asp Ala Arg Tyr Ser Lys Pro Met Val Gly Ala Gly Tyr Val 1145
1150 1155

Val Gly Pro Ser Ile Phe Leu Gly Thr Pro Gly Val Val Ser Tyr 1160
1165 1170

Tyr Leu Thr Leu Tyr Ile Gly Gly Glu Pro Gln Ala Leu Pro Glu 1175
1180 1185

Thr Leu Val Ser Thr Gly Arg Ile Ala Thr Asp Cys Arg Glu Tyr 1190
1195 1200

Leu Asp Ala Ala Glu Glu Glu Ala Ala Arg Glu Leu Pro His Ala 1205
1210 1215

Phe Ile Gly Asp Val Lys Gly Thr Thr Val Gly Gly Cys His His 1220
1225 1230

Ile Thr Ser Lys Tyr Leu Pro Arg Ser Leu Pro Lys Asp Ser Val 1235
1240 1245

Ala Val Val Gly Val Ser Ser Pro Gly Arg Ala Ala Lys Ala Val 1250
1255 1260

Cys Thr Leu Thr Asp Val Tyr Leu Pro Glu Leu Arg Pro Tyr Leu 1265
1270 1275

Gln Pro Glu Thr Ala Ser Lys Cys Trp Lys Leu Lys Leu Asp Phe 1280
1285 1290

Arg Asp Val Arg Leu Met Val Trp Lys Gly Ala Thr Ala Tyr Phe 1295
1300 1305

Gln Leu Glu Gly Leu Thr Trp Ser Ala Leu Pro Asp Tyr Ala Arg 1310
1315 1320

Phe Ile Gln Leu Pro Lys Asp Ala Val Val Tyr Ile Asp Pro Cys 1325
1330 1335

Ile Gly Pro Ala Thr Ala Asn Arg Lys Val Val Arg Thr Thr Asp 1340
1345 1350

Trp Arg Ala Asp Leu Ala Val Thr Pro Tyr Asp Tyr Gly Ala Gln 1355
1360 1365

Val Ile Leu Thr Thr Ala Trp Phe Glu Asp Leu Gly Pro Gln Trp 1370
1375 1380

Lys Ile Leu Gly Leu Gln Pro Phe Arg Arg Thr Phe Gly Phe Glu 1385
1390 1395

Asn Thr Glu Asp Trp Ala Ile Leu Ala Arg Arg Met Asn Asp Gly 1400
1405 1410

Lys Asp Tyr Thr Asp Tyr Asn Trp His Cys Val Arg Glu Arg Pro 1415
1420 1425

His Ala Ile Tyr Gly Arg Ala Arg Asp His Thr Tyr His Phe Ala 1430
1435 1440

Leu Gly Thr Glu Leu Gln Val Glu Leu Gly Arg Pro Arg Leu Pro 1445
1450 1455

Pro Glu Gln Val Pro 1460

<210> 13
<211> 249
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 2 OF PARENTAL PRRSV STRAIN 94881 ENCODED BY SEQUENCE OF SEQ ID NO:10 BETWEEN NUCLEOTIDES 11611..12360

<400> 13

Met Gln Trp Val His Cys Gly Val Lys Ser Val Ser Cys Ser Trp Met 1
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Pro Ser Leu Ser Ser Leu Leu Val Trp Leu Thr Leu Ser Ser Phe Ser 20
25 30

Pro Tyr Cys Leu Gly Ser Leu Leu Gln Ala Gly Tyr Trp Ser Ser Phe 35
40 45

Ser Glu Trp Phe Ala Pro Arg Phe Ser Val Arg Ala Leu Pro Phe Thr 50
55 60

Leu Pro Asn Tyr Arg Arg Ser Tyr Glu Gly Leu Leu Pro Asn Cys Arg 65
70 75 80

Pro Asp Val Pro Gln Phe Ala Val Lys His Pro Leu Gly Ile Leu Trp

85 90 95

His Met Arg Val Ser His Leu Ile Asp Glu Met Val Ser Arg Arg Ile 100
105 110

Tyr Arg Thr Met Glu His Ser Gly Gln Ala Ala Trp Lys Gln Val Val 115
120 125

Ser Glu Ala Thr Leu Thr Lys Leu Ser Arg Leu Asp Val Val Thr His 130
135 140

Phe Gln His Leu Ala Ala Val Glu Ala Asp Ser Cys Arg Phe Leu Ser 145
150 155 160

Ser Arg Leu Ala Met Leu Lys Asn Leu Ala Val Gly Asn Val Ser Leu
165 170 175

Glu Tyr Asn Thr Thr Leu Asp Arg Val Glu Leu Ile Phe Pro Thr Pro 180
185 190

Gly Thr Arg Pro Lys Leu Thr Asp Phe Arg Gln Trp Leu Ile Ser Val 195
200 205

His Ala Ser Ile Phe Ser Ser Val Ala Ser Ser Val Thr Leu Phe Thr 210
215 220

Val Leu Trp Leu Arg Ile Pro Ala Leu Arg Tyr Val Phe Gly Phe His 225
230 235 240

Trp Pro Thr Ala Thr His His Ser Asn 245

<210> 14
<211> 265
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 3 OF PARENTAL PRRSV STRAIN 94881 ENCODED BY SEQUENCE OF SEQ ID NO:10 BETWEEN NUCLEOTIDES 12219..13016

<400> 14

Met Ala Tyr Gln Arg Ala Arg Phe His Leu Leu Leu Cys Gly Phe Val 1
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Cys Tyr Leu Val His Ser Ala Leu Ala Ser Asn Ser Ser Ser Thr Leu
25 30 20

Cys Phe Trp Phe Pro Leu Ala His Gly Asn Thr Ser Phe Glu Leu Thr
40 45 35

Ile Asn Tyr Thr Ile Cys Lys Pro Cys Pro Thr Ser Gln Ala Ala Gln
55 60 50

Gln Arg Leu Glu Pro Gly Arg Asn Val Trp Cys Lys Ile Gly His Asp
70 75 80 65

Arg Cys Glu Glu Arg Asp His Asp Glu Leu Ser Met Ser Ile Pro Ser
85 90 95

Gly Tyr Asp Asn Leu Lys Leu Glu Gly Tyr Tyr Ala Trp Leu Ala Phe
105 110 100

Leu Ser Phe Ser Tyr Ala Ala Gln Phe His Pro Glu Leu Phe Gly Ile
120 125 115

Gly Asn Val Ser Arg Val Phe Val Asp Lys Arg His Gln Phe Ile Cys
135 140 130

Ala Glu His Asp Gly Gln Asn Ser Thr Ile Ser Ala Arg His Asn Ile
150 155 160 145

Ser Ala Ser Tyr Ala Val Tyr Tyr His His Gln Ile Asp Gly Gly Asn
165 170 175

Trp Phe His Leu Glu Trp Leu Arg Pro Phe Phe Ser Ser Trp Leu Val
185 190 180

Leu Asn Ile Ser Trp Phe Leu Arg Arg Ser Pro Ala Ser Pro Ala Ser
200 205 195

Arg Arg Ile Tyr Gln Ile Leu Arg Pro Thr Arg Pro Arg Leu Pro Val
215 220 210

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

Gln Arg Lys Val Pro Leu Pro Ser Gly Gly Arg Pro Asn Val Val Lys
245 250 255

Pro Ser Ala Phe Pro Ser Thr Ser Arg 260 265

<210> 15
<211> 183
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 4 OF PARENTAL PRRSV STRAIN 94881 ENCODED BY SEQUENCE OF SEQ ID NO:10 BETWEEN NUCLEOTIDES 12761..13312

<400> 15

Met Ala Ala Thr Ile Leu Phe Leu Leu Ala Gly Ala Gln His Leu Met 1
5 10 15

Val Ser Glu Ala Phe Ala Cys Lys Pro Cys Phe Ser Thr His Leu Ser 20
25 30

Asp Ile Lys Thr Asn Thr Thr Ala Ala Ala Gly Phe Met Val Leu Gln 35
40 45

Asn Ile Asn Cys Phe Gln Ser His Arg Ala Ser Thr Ala Gln Gly Thr 50
55 60

Thr Pro Leu Arg Arg Ser Ser Gln Cys Arg Glu Ala Val Gly Ile Pro 65
70 75 80

Gln Tyr Ile Thr Ile Thr Ala Asn Val Thr Asp Glu Ser Tyr Leu Tyr
85 90 95

Asn Ala Asp Leu Leu Met Leu Ser Ala Cys Leu Phe Tyr Ala Ser Glu 100
105 110

Met Ser Glu Lys Gly Phe Lys Val Ile Phe Gly Asn Ile Ser Gly Val 115
120 125

Val Ser Ala Cys Val Asn Phe Thr Asp Tyr Val Ala His Val Thr Gln 130
135 140

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His Thr Gln Gln His His Leu Val Ile Asp His Ile Arg Leu Leu His 145
150 155 160

Phe Leu Thr Pro Ser Thr Met Arg Trp Ala Thr Thr Ile Ala Cys Leu
165 170 175

Phe Ala Ile Leu Leu Ala Val 180

<210> 16
<211> 201
<212> PRT
<213> Artificial Sequence

<220>
<223> ORF 5 OF PARENTAL PRRSV STRAIN 94881 ENCODED BY SEQUENCE OF SEQ ID NO:10 BETWEEN NUCLEOTIDES 13309..13914

<400> 16

Met Lys Cys Ser Cys Lys Leu Gly His Phe Leu Thr Pro His Ser Cys 1
5 10 15

Phe Trp Trp Leu Phe Leu Leu Cys Thr Gly Leu Ser Trp Ser Phe Val 20
25 30

Asp Gly Asn Asp Asn Ser Ser Thr Ser Gln Tyr Ile Tyr Asn Leu Thr 35
40 45

Ile Cys Glu Leu Asn Gly Thr Glu Trp Leu Ser Gly His Phe Asp Trp 50
55 60

Ala Val Glu Thr Phe Val Leu Tyr Pro Val Ala Thr His Ile Ile Ser 65
70 75 80

Leu Gly Phe Leu Thr Thr Ser His Phe Leu Asp Ala Leu Gly Leu Gly
85 90 95

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

Met Tyr Gly Val Cys Ala Phe Ala Ala Leu Val Cys Phe Val Ile Arg 115
120 125

Ala Ala Lys Asn Cys Met Ala Cys Arg Tyr Ala Arg Thr Arg Phe Thr 130
135 140

Asn Phe Ile Val Asp Asp Arg Gly Arg Ile His Arg Trp Lys Ser Ser 145
150 155 160

Ile Val Val Glu Lys Leu Gly Lys Ala Glu Val Gly Gly Asp Leu Val
165 170 175

Asn Ile Lys His Val Val Leu Glu Gly Val Lys Ala Gln Pro Leu Thr 180
185 190

Arg Thr Ser Ala Glu Gln Trp Glu Ala 195 200

<210> 17
<211> 173
<212> PRT
<213> Porcine Reproductive Respiratory Syndrome Virus

<400> 17

Met Gly Ser Leu Asp Asp Phe Cys Asn Asp Pro Thr Ala Ala Gln Lys 1
5 10 15

Leu Val Leu Ala Phe Ser Ile Thr Tyr Thr Pro Ile Met Ile Tyr Ala 20
25 30

Leu Lys Val Ser Arg Gly Arg Leu Leu Gly Leu Leu His Ile Leu Ile 35
40 45

Phe Leu Asn Cys Ser Phe Thr Phe Gly Tyr Met Thr Tyr Val His Phe 50
55 60

Gln Ser Thr Asn Arg Val Ala Leu Thr Leu Gly Ala Val Val Ala Leu 65
70 75 80

Leu Trp Gly Val Tyr Ser Leu Thr Glu Ser Trp Lys Phe Ile Thr Ser
85 90 95

Arg Cys Arg Leu Cys Cys Leu Gly Arg Arg Tyr Ile Leu Ala Pro Ala 100
105 110

His His Val Glu Ser Ala Ala Gly Leu His Ser Ile Pro Ala Ser Gly 115
120 125

Asn Arg Ala Tyr Ala Val Arg Lys Pro Gly Leu Thr Ser Val Asn Gly 130
135 140

Thr Leu Val Pro Gly Leu Arg Ser Leu Val Leu Gly Gly Lys Arg Ala 145
150 155 160

Val Lys Arg Gly Val Val Asn Leu Val Lys Tyr Gly Arg 165
170

<210> 18
<211> 128
<212> PRT
<213> Porcine Reproductive Respiratory Syndrome Virus

<400> 18

Met Ala Gly Lys Asn Gln Ser Gln Lys Lys Arg Arg Asn Ala Ala Pro 1
5 10 15

Met Gly Lys Gly Gln Pro Val Asn Gln Leu Cys Gln Leu Leu Gly Thr 20
25 30

Met Ile Lys Ser Gln Arg Gln Gln Ser Arg Gly Gly Gln Ala Lys Lys 35
40 45

Lys Lys Pro Glu Lys Pro His Phe Pro Leu Ala Ala Glu Asp Asp Ile 50
55 60

Arg His His Leu Thr Gln Ala Glu Arg Ser Leu Cys Leu Gln Ser Ile 65
70 75 80

Gln Thr Ala Phe Asn Gln Gly Ala Gly Thr Ala Ser Leu Ser Ser Ser
85 90 95

Gly Lys Val Ser Phe Gln Val Glu Phe Met Leu Pro Val Ala His Thr 100
105 110

Val Arg Leu Ile Arg Val Thr Ser Thr Ser Ala Ser Gln Gly Ala Asn 115
120 125

<210> 19
<211> 7050
<212> DNA
<213> Artificial Sequence

<220>

<223> Nucleotide encoding attenuated PRRSV 94881 ORF1A

<400> 19
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gacacggacc tcggtgcagt tggcttgttt cacaagccta aagacaagct ccattggaaa 180

gttcccattg gtatccccca ggtggaatgt tctccatctg ggtgttgctg gctgtcaacc 240

atttttcctt tagcgcgcat gacctccggc aatcacaact tccttcaacg actcgtgaag 300

gttgctgatg tattgtaccg tgacggttgc ttaaccccta gacacctccg tgaactccaa 360

gtttacgagc gtggttgcaa ttggtatccg attacggggc ctgtgcctgg gatggctgtg 420

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gacgttctcc tcaaacccgg acttgacaca acacccggca ttcaaccagg gcatggggcc 300

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caagtgccgt ga 4392

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gtagtcactc atttccaaca cctggccgca gtggaggctg attcttgccg cttccttagc 480

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tttaggcaat ggcttatcag cgtgcacgct tccatcttct cctctgtggc ttcgtctgtt 660

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tggcccacgg caacacatca ttcgaactaa 750

<210> 22
<211> 798
<212> DNA
<213> Artificial Sequence

<220>
<223> Nucleotide encoding attenuated PRRSV 94881 ORF3

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cacagtgctt tggcttcgaa ttccagctct acgctatgtt tttggtttcc attggcccac 120

ggcaacacat cattcgaact aactatcaat tacactatat gtaagccatg ccctaccagt 180

caagctgccc aacaaagact cgagcctggc cgtaacgtgt ggtgcaaaat agggcacgac 240

aggtgtgagg aacgtgacca tgatgagttg tcaatgtcca ttccgtccgg gtacgacaac 300

ctcaaacttg agggttatta tgcttggctg gctttttttgt ccttttcctа cgcggcccaa 360

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cagttcattt gcgccgagca tgatggacaa aattcaacca tatctgccag acacaacatc 480

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cggctgccgg tttcatggtc cttcagaaca tcaattgttt ccaatctcac agggcctcaa 720

cagcgcaagg taccactccc ctcaggaggt cgtcccaatg tcgtgaagcc gtcggcattc 780

cccagtacat cacgataa 798

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<211> 552
<212> DNA
<213> Artificial Sequence

<220>
<223> Nucleotide encoding attenuated PRRSV 94881 ORF4

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ttcttgacac cgtctacgat gaggtgggct acaaccattg cttgtttgct tgccattctt 540

ttggcggtat ga 552

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<211> 606
<212> DNA
<213> Artificial Sequence

<220>
<223> Nucleotide encoding attenuated PRRSV 94881 ORF5

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atagtggtgg agaaattggg caaagctgaa gtcggtggtg accttgtcaa cattaagcat 540

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<210> 25
<211> 522
<212> DNA
<213> Artificial Sequence

<220>
<223> Nucleotide encoding attenuated PRRSV 94881 ORF6

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tcagtgaacg gcactctagt acctgggctt cggagcctcg tgctgggcgg caaacgagct 480

gttaaacgag gagtggttaa cctcgtcaag tatggccggt aa 522

<210> 26
<211> 431
<212> DNA
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<220>
<223> Nucleotide encoding attenuated PRRSV 94881 ORF7

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<210> 27
<211> 7083
<212> DNA
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<220>
<223> Nucleotide encoding parental PRRSV 94881 ORF1a

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<400> 28
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<210> 30
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<210> 34
<211> 387
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