

9869SG2164 Sequence listings_ST25.txt
SEQUENCE LISTING

<110> Exploit Technologies Pte. Ltd.
<120> NOVEL ATTENUATED DENGUE VIRUS STRAINS FOR VACCINE APPLICATION
<130> 9869SG2164
<160> 12
<170> PatentIn version 3.5
<210> 1
<211> 3392
<212> PRT
<213> Dengue virus type 1

<220>
<221> MISC_FEATURE
<222> (2494)..(3392)
<223> Nonstructural protein 5 (NS5) in DENV1 westpac74

<400> 1

Met Asn Asn Gln Arg Lys Lys Thr Gly Arg Pro Ser Phe Asn Met Leu
1 5 10 15

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

Phe Ser Lys Gly Leu Leu Ser Gly Gln Gly Pro Met Lys Leu Val Met
35 40 45

Ala Phe Ile Ala Phe Leu Arg Phe Leu Ala Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Ala Arg Trp Gly Ser Phe Lys Lys Asn Gly Ala Ile Lys Val
65 70 75 80

Leu Arg Gly Phe Lys Lys Glu Ile Ser Asn Met Leu Asn Ile Met Asn
85 90 95

Arg Arg Lys Arg Ser Val Thr Met Leu Leu Met Leu Leu Pro Thr Ala
100 105 110

Leu Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
115 120 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
130 135 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
145 150 155 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Thr Glu Pro Asp
165 170 175

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Asp Val Asp Cys Trp Cys Asn Ala Thr Glu Thr Trp Val Thr Tyr Gly
 180 185 190
 Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
 195 200 205
 Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Thr Glu Thr Trp
 210 215 220
 Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
 225 230 235 240
 Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
 245 250 255
 Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
 260 265 270
 Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
 275 280 285
 Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
 290 295 300
 Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asp Lys Pro Thr
 305 310 315 320
 Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
 325 330 335
 Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
 340 345 350
 Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Thr
 355 360 365
 Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
 370 375 380
 Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
 385 390 395 400
 Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
 405 410 415
 Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
 420 425 430
 Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala
 435 440 445

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Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Ala Leu Thr Leu Asp
 450 455 460

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

Met Glu Lys Lys Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
 485 490 495

Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
 500 505 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
 515 520 525

Glu Val val val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
 530 535 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
 545 550 555 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
 565 570 575

Met Ser Tyr val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
 580 585 590

Ala Glu Thr Gln His Gly Thr val Leu val Gln val Lys Tyr Glu Gly
 595 600 605

Thr Asp Ala Pro Cys Lys Ile Pro Phe Ser Ser Gln Asp Glu Lys Gly
 610 615 620

Val Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
 625 630 635 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
 645 650 655

Tyr Ile val val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
 660 665 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
 675 680 685

Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
 690 695 700

Ile Gly Gly val Phe Thr Ser val Gly Lys Leu Ile His Gln Ile Phe
 705 710 715 720

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Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
725 730 735

Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Ser
740 745 750

Thr Ser Leu Ser Met Thr Cys Ile Ala Val Gly Met Val Thr Leu Tyr
755 760 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Ile Asn Trp Lys
770 775 780

Gly Arg Glu Leu Lys Cys Gly Ser Gly Ile Phe Val Thr Asn Glu Val
785 790 795 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Ala Asp Ser Pro Lys Arg
805 810 815

Leu Ser Ala Ala Ile Gly Lys Ala Trp Glu Glu Gly Val Cys Gly Ile
820 825 830

Arg Ser Ala Thr Arg Leu Glu Asn Ile Met Trp Lys Gln Ile Ser Asn
835 840 845

Glu Leu Asn His Ile Leu Leu Glu Asn Asp Met Lys Phe Thr Val Val
850 855 860

Val Gly Asp Val Ser Gly Ile Leu Ala Gln Gly Lys Lys Met Ile Arg
865 870 875 880

Pro Gln Pro Met Glu His Lys Tyr Ser Trp Lys Ser Trp Gly Lys Ala
885 890 895

Lys Ile Ile Gly Ala Asp Val Gln Asn Thr Thr Phe Ile Ile Asp Gly
900 905 910

Pro Asn Thr Pro Glu Cys Pro Asp Asn Gln Arg Ala Trp Asn Ile Trp
915 920 925

Glu Val Glu Asp Tyr Gly Phe Gly Ile Phe Thr Thr Asn Ile Trp Leu
930 935 940

Lys Leu Arg Asp Ser Tyr Thr Gln Val Cys Asp His Arg Leu Met Ser
945 950 955 960

Ala Ala Ile Lys Asp Ser Lys Ala Val His Ala Asp Met Gly Tyr Trp
965 970 975

Ile Glu Ser Glu Lys Asn Glu Thr Trp Lys Leu Ala Arg Ala Ser Phe
980 985 990

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Ile Glu Val Lys Thr Cys Ile Trp Pro Lys Ser His Thr Leu Trp Ser
 995 1000 1005

Asn Gly Val Leu Glu Ser Glu Met Ile Ile Pro Lys Ile Tyr Gly
 1010 1015 1020

Gly Pro Ile Ser Gln His Asn Tyr Arg Pro Gly Tyr Phe Thr Gln
 1025 1030 1035

Thr Ala Gly Pro Trp His Leu Gly Lys Leu Glu Leu Asp Phe Asp
 1040 1045 1050

Leu Cys Glu Gly Thr Thr Val Val Val Asp Glu His Cys Gly Asn
 1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Val Thr Gly Lys Thr Ile
 1070 1075 1080

His Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Phe
 1085 1090 1095

Lys Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Val
 1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Lys Ser Met Val Ser Ala Gly
 1115 1120 1125

Ser Gly Glu Val Asp Ser Phe Ser Leu Gly Leu Leu Cys Ile Ser
 1130 1135 1140

Ile Met Ile Glu Glu Val Met Arg Ser Arg Trp Ser Arg Lys Met
 1145 1150 1155

Leu Met Thr Gly Thr Leu Ala Val Phe Leu Leu Leu Thr Met Gly
 1160 1165 1170

Gln Leu Thr Trp Asn Asp Leu Ile Arg Leu Cys Ile Met Val Gly
 1175 1180 1185

Ala Asn Ala Ser Asp Lys Met Gly Met Gly Thr Thr Tyr Leu Ala
 1190 1195 1200

Leu Met Ala Thr Phe Arg Met Arg Pro Met Phe Ala Val Gly Leu
 1205 1210 1215

Leu Phe Arg Arg Leu Thr Ser Arg Glu Val Leu Leu Leu Thr Val
 1220 1225 1230

Gly Leu Ser Leu Val Ala Ser Val Glu Leu Pro Asn Ser Leu Glu
 1235 1240 1245

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Glu Leu Gly Asp Gly Leu Ala Met Gly Ile Met Met Leu Lys Leu
 1250 1255 1260
 Leu Thr Asp Phe Gln Ser His Gln Leu Trp Ala Thr Leu Leu Ser
 1265 1270 1275
 Leu Thr Phe Val Lys Thr Thr Phe Ser Leu His Tyr Ala Trp Lys
 1280 1285 1290
 Thr Met Ala Met Ile Leu Ser Ile Val Ser Leu Phe Pro Leu Cys
 1295 1300 1305
 Leu Ser Thr Thr Ser Gln Lys Thr Thr Trp Leu Pro Val Leu Leu
 1310 1315 1320
 Gly Ser Leu Gly Cys Lys Pro Leu Thr Met Phe Leu Ile Thr Glu
 1325 1330 1335
 Asn Lys Ile Trp Gly Arg Lys Ser Trp Pro Leu Asn Glu Gly Ile
 1340 1345 1350
 Met Ala Val Gly Ile Val Ser Ile Leu Leu Ser Ser Leu Leu Lys
 1355 1360 1365
 Asn Asp Val Pro Leu Ala Gly Pro Leu Ile Ala Gly Gly Met Leu
 1370 1375 1380
 Ile Ala Cys Tyr Val Ile Ser Gly Ser Ser Ala Asp Leu Ser Leu
 1385 1390 1395
 Glu Lys Ala Ala Glu Val Ser Trp Glu Glu Glu Ala Glu His Ser
 1400 1405 1410
 Gly Ala Ser His Asn Ile Leu Val Glu Val Gln Asp Asp Gly Thr
 1415 1420 1425
 Met Lys Ile Lys Asp Glu Glu Arg Asp Asp Thr Leu Thr Ile Leu
 1430 1435 1440
 Leu Lys Ala Thr Leu Leu Ala Ile Ser Gly Val Tyr Pro Met Ser
 1445 1450 1455
 Ile Pro Ala Thr Leu Phe Val Trp Tyr Phe Trp Gln Lys Lys Lys
 1460 1465 1470
 Gln Arg Ser Gly Val Leu Trp Asp Thr Pro Ser Pro Pro Glu Val
 1475 1480 1485
 Glu Arg Ala Val Leu Asp Asp Gly Ile Tyr Arg Ile Leu Gln Arg
 1490 1495 1500

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Gly Leu Leu Gly Arg Ser Gln val Gly val Gly val Phe Gln Glu
 1505 1510 1515
 Gly Val Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
 1520 1525 1530
 Met Tyr Gln Gly Lys Arg Leu Glu Pro Ser Trp Ala Ser Val Lys
 1535 1540 1545
 Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Arg Phe Gln Gly Ser
 1550 1555 1560
 Trp Asn Ala Gly Glu Glu Val Gln Val Ile Ala Val Glu Pro Gly
 1565 1570 1575
 Lys Asn Pro Lys Asn Val Gln Thr Ala Pro Gly Thr Phe Lys Thr
 1580 1585 1590
 Pro Glu Gly Glu Val Gly Ala Ile Ala Leu Asp Phe Lys Pro Gly
 1595 1600 1605
 Thr Ser Gly Ser Pro Ile Val Asn Arg Glu Gly Lys Ile Val Gly
 1610 1615 1620
 Leu Tyr Gly Asn Gly Val Val Thr Thr Ser Gly Thr Tyr Val Ser
 1625 1630 1635
 Ala Ile Ala Gln Ala Lys Ala Ser Gln Glu Gly Pro Leu Pro Glu
 1640 1645 1650
 Ile Glu Asp Glu Val Phe Arg Lys Arg Asn Leu Thr Ile Met Asp
 1655 1660 1665
 Leu His Pro Gly Ser Gly Lys Thr Arg Arg Tyr Leu Pro Ala Ile
 1670 1675 1680
 Val Arg Glu Ala Ile Lys Arg Lys Leu Arg Thr Leu Val Leu Ala
 1685 1690 1695
 Pro Thr Arg Val Val Ala Ser Glu Met Ala Glu Ala Leu Lys Gly
 1700 1705 1710
 Met Pro Ile Arg Tyr Gln Thr Thr Ala Val Lys Ser Glu His Thr
 1715 1720 1725
 Gly Lys Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met
 1730 1735 1740
 Arg Leu Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Met Ile Ile
 1745 1750 1755

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Met Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg
 1760 1765 1770
 Gly Tyr Ile Ser Thr Arg Val Gly Met Gly Glu Ala Ala Ala Ile
 1775 1780 1785
 Phe Met Thr Ala Thr Pro Pro Gly Ser Val Glu Ala Phe Pro Gln
 1790 1795 1800
 Ser Asn Ala Val Ile Gln Asp Glu Glu Arg Asp Ile Pro Glu Arg
 1805 1810 1815
 Ser Trp Asn Ser Gly Tyr Asp Trp Ile Thr Asp Phe Pro Gly Lys
 1820 1825 1830
 Thr Val Trp Phe Val Pro Ser Ile Lys Ser Gly Asn Asp Ile Ala
 1835 1840 1845
 Asn Cys Leu Arg Lys Asn Gly Lys Arg Val Val Gln Leu Ser Arg
 1850 1855 1860
 Lys Thr Phe Asp Thr Glu Tyr Gln Lys Thr Lys Asn Asn Asp Trp
 1865 1870 1875
 Asp Tyr Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe
 1880 1885 1890
 Arg Ala Asp Arg Val Ile Asp Pro Arg Arg Cys Leu Lys Pro Val
 1895 1900 1905
 Ile Leu Lys Asp Gly Pro Glu Arg Val Ile Leu Ala Gly Pro Met
 1910 1915 1920
 Pro Val Thr Val Ala Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly
 1925 1930 1935
 Arg Asn Gln Asn Lys Glu Gly Asp Gln Tyr Ile Tyr Met Gly Gln
 1940 1945 1950
 Pro Leu Lys Asn Asp Glu Asp His Ala His Trp Thr Glu Ala Lys
 1955 1960 1965
 Met Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ala
 1970 1975 1980
 Leu Phe Glu Pro Glu Arg Glu Lys Ser Ala Ala Ile Asp Gly Glu
 1985 1990 1995
 Tyr Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Glu Leu Met
 2000 2005 2010

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Arg Arg Gly Asp Leu Pro Val Trp Leu Ser Tyr Lys Val Ala Ser
 2015 2020 2025
 Glu Gly Phe Gln Tyr Ser Asp Arg Arg Trp Cys Phe Asp Gly Glu
 2030 2035 2040
 Arg Asn Asn Gln Val Leu Glu Glu Asn Met Asp Val Glu Ile Trp
 2045 2050 2055
 Thr Lys Glu Gly Glu Arg Lys Lys Leu Arg Pro Arg Trp Leu Asp
 2060 2065 2070
 Ala Arg Thr Tyr Ser Asp Pro Leu Ala Leu Arg Glu Phe Lys Glu
 2075 2080 2085
 Phe Ala Ala Gly Arg Arg Ser Val Ser Gly Asp Leu Ile Leu Glu
 2090 2095 2100
 Ile Gly Lys Leu Pro Gln His Leu Thr Gln Arg Ala Gln Asn Ala
 2105 2110 2115
 Leu Asp Asn Leu Val Met Leu His Asn Ser Glu Gln Gly Gly Lys
 2120 2125 2130
 Ala Tyr Arg His Ala Met Glu Glu Leu Pro Asp Thr Ile Glu Thr
 2135 2140 2145
 Leu Met Leu Leu Ala Leu Ile Ala Val Leu Thr Gly Gly Val Thr
 2150 2155 2160
 Leu Phe Phe Leu Ser Gly Arg Gly Leu Gly Lys Thr Ser Ile Gly
 2165 2170 2175
 Leu Leu Cys Val Ile Ala Ser Ser Ala Leu Leu Trp Met Ala Ser
 2180 2185 2190
 Val Glu Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe
 2195 2200 2205
 Leu Met Val Leu Leu Ile Pro Glu Pro Asp Arg Gln Arg Thr Pro
 2210 2215 2220
 Gln Asp Asn Gln Leu Ala Tyr Val Val Ile Gly Leu Leu Phe Met
 2225 2230 2235
 Ile Leu Thr Val Ala Ala Asn Glu Met Gly Leu Leu Glu Thr Thr
 2240 2245 2250
 Lys Lys Asp Leu Gly Ile Gly His Ala Ala Ala Glu Asn His His
 2255 2260 2265

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His Ala Ala Met Leu Asp Val Asp Leu His Pro Ala Ser Ala Trp
 2270 2275 2280
 Thr Leu Tyr Ala Val Ala Thr Thr Ile Ile Thr Pro Met Met Arg
 2285 2290 2295
 His Thr Ile Glu Asn Thr Thr Ala Asn Ile Ser Leu Thr Ala Ile
 2300 2305 2310
 Ala Asn Gln Ala Ala Ile Leu Met Gly Leu Asp Lys Gly Trp Pro
 2315 2320 2325
 Ile Ser Lys Met Asp Ile Gly Val Pro Leu Leu Ala Leu Gly Cys
 2330 2335 2340
 Tyr Ser Gln Val Asn Pro Leu Thr Leu Thr Ala Ala Val Phe Met
 2345 2350 2355
 Leu Val Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys
 2360 2365 2370
 Ala Thr Arg Glu Ala Gln Lys Arg Thr Ala Ala Gly Ile Met Lys
 2375 2380 2385
 Asn Pro Thr Val Asp Gly Ile Val Ala Ile Asp Leu Asp Pro Val
 2390 2395 2400
 Val Tyr Asp Ala Lys Phe Glu Lys Gln Leu Gly Gln Ile Met Leu
 2405 2410 2415
 Leu Ile Leu Cys Thr Ser Gln Ile Leu Leu Met Arg Thr Thr Trp
 2420 2425 2430
 Ala Leu Cys Glu Ser Ile Thr Leu Ala Thr Gly Pro Leu Thr Thr
 2435 2440 2445
 Leu Trp Glu Gly Ser Pro Gly Lys Phe Trp Asn Thr Thr Ile Ala
 2450 2455 2460
 Val Ser Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala
 2465 2470 2475
 Gly Leu Ala Phe Ser Leu Met Lys Ser Leu Gly Gly Gly Arg Arg
 2480 2485 2490
 Gly Thr Gly Ala Gln Gly Glu Thr Leu Gly Glu Lys Trp Lys Arg
 2495 2500 2505
 Gln Leu Asn Gln Leu Ser Lys Ser Glu Phe Asn Thr Tyr Lys Arg
 2510 2515 2520

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Ser Gly Ile Ile Glu Val Asp Arg Ser Glu Ala Lys Glu Gly Leu
 2525 2530 2535
 Lys Arg Gly Glu Thr Thr Lys His Ala Val Ser Arg Gly Thr Ala
 2540 2545 2550
 Lys Leu Arg Trp Phe Val Glu Arg Asn Leu Val Lys Pro Glu Gly
 2555 2560 2565
 Lys Val Ile Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr
 2570 2575 2580
 Cys Ala Gly Leu Lys Lys Val Thr Glu Val Lys Gly Tyr Thr Lys
 2585 2590 2595
 Gly Gly Pro Gly His Glu Glu Pro Ile Pro Met Ala Thr Tyr Gly
 2600 2605 2610
 Trp Asn Leu Val Lys Leu Tyr Ser Gly Lys Asp Val Phe Phe Thr
 2615 2620 2625
 Pro Pro Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser
 2630 2635 2640
 Ser Pro Asn Pro Thr Ile Glu Glu Gly Arg Thr Leu Arg Val Leu
 2645 2650 2655
 Lys Met Val Glu Pro Trp Leu Arg Gly Asn Gln Phe Cys Ile Lys
 2660 2665 2670
 Ile Leu Asn Pro Tyr Met Pro Ser Val Val Glu Thr Leu Glu Gln
 2675 2680 2685
 Met Gln Arg Lys His Gly Gly Met Leu Val Arg Asn Pro Leu Ser
 2690 2695 2700
 Arg Asn Ser Thr His Glu Met Tyr Trp Val Ser Cys Gly Thr Gly
 2705 2710 2715
 Asn Ile Val Ser Ala Val Asn Met Thr Ser Arg Met Leu Leu Asn
 2720 2725 2730
 Arg Phe Thr Met Ala His Arg Lys Pro Thr Tyr Glu Arg Asp Val
 2735 2740 2745
 Asp Leu Gly Ala Gly Thr Arg His Val Ala Val Glu Pro Glu Val
 2750 2755 2760
 Ala Asn Leu Asp Ile Ile Gly Gln Arg Ile Glu Asn Ile Lys Asn
 2765 2770 2775

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Glu His Lys Ser Thr Trp His Tyr Asp Glu Asp Asn Pro Tyr Lys
 2780 2785 2790
 Thr Trp Ala Tyr His Gly Ser Tyr Glu Val Lys Pro Ser Gly Ser
 2795 2800 2805
 Ala Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro
 2810 2815 2820
 Trp Asp Val Ile Pro Met Val Thr Gln Ile Ala Met Thr Asp Thr
 2825 2830 2835
 Thr Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr
 2840 2845 2850
 Arg Thr Pro Lys Ala Lys Arg Gly Thr Ala Gln Ile Met Glu Val
 2855 2860 2865
 Thr Ala Arg Trp Leu Trp Gly Phe Leu Ser Arg Asn Lys Lys Pro
 2870 2875 2880
 Arg Ile Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn
 2885 2890 2895
 Ala Ala Ile Gly Ala Val Phe Val Asp Glu Asn Gln Trp Asn Ser
 2900 2905 2910
 Ala Lys Glu Ala Val Glu Asp Glu Arg Phe Trp Asp Leu Val His
 2915 2920 2925
 Arg Glu Arg Glu Leu His Lys Gln Gly Lys Cys Ala Thr Cys Val
 2930 2935 2940
 Tyr Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly
 2945 2950 2955
 Lys Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala
 2960 2965 2970
 Arg Phe Leu Glu Phe Glu Ala Leu Gly Phe Met Asn Glu Asp His
 2975 2980 2985
 Trp Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly
 2990 2995 3000
 Leu His Lys Leu Gly Tyr Ile Leu Arg Asp Ile Ser Lys Ile Pro
 3005 3010 3015
 Gly Gly Asn Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg
 3020 3025 3030

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Ile	Thr	Glu	Asp	Asp	Leu	Gln	Asn	Glu	Ala	Lys	Ile	Thr	Asp	Ile
3035						3040					3045			
Met	Glu	Pro	Glu	His	Ala	Leu	Leu	Ala	Thr	Ser	Ile	Phe	Lys	Leu
3050						3055					3060			
Thr	Tyr	Gln	Asn	Lys	Val	Val	Arg	Val	Gln	Arg	Pro	Ala	Lys	Asn
3065						3070					3075			
Gly	Thr	Val	Met	Asp	Val	Ile	Ser	Arg	Arg	Asp	Gln	Arg	Gly	Ser
3080						3085					3090			
Gly	Gln	Val	Gly	Thr	Tyr	Gly	Leu	Asn	Thr	Phe	Thr	Asn	Met	Glu
3095						3100					3105			
Ala	Gln	Leu	Ile	Arg	Gln	Met	Glu	Ser	Glu	Gly	Ile	Phe	Ser	Pro
3110						3115					3120			
Ser	Glu	Leu	Glu	Thr	Pro	Asn	Leu	Ala	Glu	Arg	Val	Leu	Asp	Trp
3125						3130					3135			
Leu	Lys	Lys	His	Gly	Thr	Glu	Arg	Leu	Lys	Arg	Met	Ala	Ile	Ser
3140						3145					3150			
Gly	Asp	Asp	Cys	Val	Val	Lys	Pro	Ile	Asp	Asp	Arg	Phe	Ala	Thr
3155						3160					3165			
Ala	Leu	Thr	Ala	Leu	Asn	Asp	Met	Gly	Lys	Val	Arg	Lys	Asp	Ile
3170						3175					3180			
Pro	Gln	Trp	Glu	Pro	Ser	Lys	Gly	Trp	Asn	Asp	Trp	Gln	Gln	Val
3185						3190					3195			
Pro	Phe	Cys	Ser	His	His	Phe	His	Gln	Leu	Ile	Met	Lys	Asp	Gly
3200						3205					3210			
Arg	Glu	Ile	Val	Val	Pro	Cys	Arg	Asn	Gln	Asp	Glu	Leu	Val	Gly
3215						3220					3225			
Arg	Ala	Arg	Val	Ser	Gln	Gly	Ala	Gly	Trp	Ser	Leu	Arg	Glu	Thr
3230						3235					3240			
Ala	Cys	Leu	Gly	Lys	Ser	Tyr	Ala	Gln	Met	Trp	Gln	Leu	Met	Tyr
3245						3250					3255			
Phe	His	Arg	Arg	Asp	Leu	Arg	Leu	Ala	Ala	Asn	Ala	Ile	Cys	Ser
3260						3265					3270			
Ala	Val	Pro	Val	Asp	Trp	Val	Pro	Thr	Ser	Arg	Thr	Thr	Trp	Ser
3275						3280					3285			

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Ile His Ala His His Gln Trp Met Thr Thr Glu Asp Met Leu Ser
 3290 3295 3300

Val Trp Asn Arg Val Trp Ile Glu Glu Asn Pro Trp Met Glu Asp
 3305 3310 3315

Lys Thr His Val Ser Ser Trp Glu Asp Val Pro Tyr Leu Gly Lys
 3320 3325 3330

Arg Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ala Arg
 3335 3340 3345

Ala Thr Trp Ala Thr Asn Ile Gln Val Ala Ile Asn Gln Val Arg
 3350 3355 3360

Arg Leu Ile Gly Asn Glu Asn Tyr Leu Asp Phe Met Thr Ser Met
 3365 3370 3375

Lys Arg Phe Lys Asn Glu Ser Asp Pro Glu Gly Ala Leu Trp
 3380 3385 3390

<210> 2
 <211> 3391
 <212> PRT
 <213> Dengue virus type 2

<220>
 <221> MISC_FEATURE
 <222> (2492)..(3391)
 <223> Non-structural protein 5 (NS5) in DENV-2 TSV01 wildtype

<400> 2

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

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

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
 35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
 50 55 60

Ile Leu Lys Arg Trp Gly Thr Ile Lys Lys Ser Lys Ala Ile Asn Val
 65 70 75 80

Leu Arg Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn
 85 90 95

Arg Arg Arg Arg Thr Ala Gly Ile Ile Ile Met Met Ile Pro Thr Val
 100 105 110

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Met Ala Phe His Leu Thr Thr Arg Asn Gly Glu Pro His Met Ile Val
 115 120 125
 Ser Arg Gln Glu Lys Gly Lys Ser Leu Leu Phe Lys Thr Glu Asn Gly
 130 135 140
 Val Asn Met Cys Thr Leu Met Ala Met Asp Leu Gly Glu Leu Cys Glu
 145 150 155 160
 Asp Thr Ile Thr Tyr Asn Cys Pro Leu Leu Arg Gln Asn Glu Pro Glu
 165 170 175
 Asp Ile Asp Cys Trp Cys Asn Ser Thr Ser Thr Trp Val Thr Tyr Gly
 180 185 190
 Thr Cys Thr Ala Thr Gly Glu His Arg Arg Glu Lys Arg Ser Val Ala
 195 200 205
 Leu Val Pro His Val Gly Met Gly Leu Glu Thr Arg Thr Glu Thr Trp
 210 215 220
 Met Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Ile Glu Thr Trp
 225 230 235 240
 Val Leu Arg His Pro Gly Phe Thr Ile Met Ala Ala Ile Leu Ala Tyr
 245 250 255
 Thr Ile Gly Thr Thr Tyr Phe Gln Arg Val Leu Ile Phe Ile Leu Leu
 260 265 270
 Thr Ala Val Thr Pro Ser Met Thr Met Arg Cys Ile Gly Ile Ser Asn
 275 280 285
 Arg Asp Phe Val Glu Gly Val Ser Gly Gly Ser Trp Val Asp Ile Val
 290 295 300
 Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
 305 310 315 320
 Leu Asp Phe Glu Leu Val Lys Thr Glu Ala Lys His Pro Ala Thr Leu
 325 330 335
 Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Ala Ser
 340 345 350
 Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
 355 360 365
 Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
 370 375 380

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Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Thr
385 390 395 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
405 410 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu Asn Ala Val Gly
420 425 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Val Thr Pro Gln Ser
435 440 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
450 455 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465 470 475 480

Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
485 490 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
500 505 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
515 520 525

Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
530 535 540

Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545 550 555 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
565 570 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
580 585 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
595 600 605

Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
610 615 620

Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
625 630 635 640

Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
645 650 655

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Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Ser Trp Phe
660 665 670

Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
675 680 685

Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
690 695 700

Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
705 710 715 720

Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
725 730 735

Ile Leu Ile Gly Val Val Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
740 745 750

Thr Ser Leu Ser Val Ser Leu Val Leu Val Gly Val Val Thr Leu Tyr
755 760 765

Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
770 775 780

Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
785 790 795 800

His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
805 810 815

Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Gly Ile Cys Gly Ile
820 825 830

Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
835 840 845

Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
850 855 860

Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
865 870 875 880

Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Ala Trp Gly Lys Ala
885 890 895

Lys Met Leu Ser Thr Glu Leu His Asn His Thr Phe Leu Ile Asp Gly
900 905 910

Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
915 920 925

9869SG2164 Sequence listings_ST25.txt

Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
 930 935 940

Lys Leu Lys Glu Arg Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
 945 950 955 960

Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
 965 970 975

Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
 980 985 990

Ile Glu Val Lys Ser Cys His Trp Pro Lys Ser His Thr Leu Trp Ser
 995 1000 1005

Asn Gly Val Leu Glu Ser Glu Met Ile Ile Pro Lys Asn Phe Ala
 1010 1015 1020

Gly Pro Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln
 1025 1030 1035

Thr Ala Gly Pro Trp His Leu Gly Arg Leu Glu Met Asp Phe Asp
 1040 1045 1050

Phe Cys Glu Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
 1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
 1070 1075 1080

Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
 1085 1090 1095

Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
 1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
 1115 1120 1125

His Gly Gln Ile Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
 1130 1135 1140

Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
 1145 1150 1155

Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
 1160 1165 1170

Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
 1175 1180 1185

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Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
 1190 1195 1200
 Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
 1205 1210 1215
 Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
 1220 1225 1230
 Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
 1235 1240 1245
 Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Ile
 1250 1255 1260
 Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
 1265 1270 1275
 Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
 1280 1285 1290
 Val Ser Cys Thr Thr Leu Ala Val Val Ser Val Ser Pro Leu Leu
 1295 1300 1305
 Leu Thr Ser Ser Gln Gln Lys Ala Asp Trp Ile Pro Leu Ala Leu
 1310 1315 1320
 Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
 1325 1330 1335
 Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
 1340 1345 1350
 Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
 1355 1360 1365
 Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
 1370 1375 1380
 Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
 1385 1390 1395
 Glu Arg Ala Ala Asp Val Arg Trp Glu Glu Gln Ala Glu Ile Ser
 1400 1405 1410
 Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
 1415 1420 1425
 Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
 1430 1435 1440

9869SG2164 Sequence listings_ST25.txt

Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Ala Ser
 1445 1450 1455
 Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
 1460 1465 1470
 Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Val
 1475 1480 1485
 Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
 1490 1495 1500
 Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
 1505 1510 1515
 Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
 1520 1525 1530
 Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
 1535 1540 1545
 Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
 1550 1555 1560
 Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
 1565 1570 1575
 Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
 1580 1585 1590
 Asn Thr Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
 1595 1600 1605
 Thr Ser Gly Ser Pro Ile Val Asp Lys Lys Gly Lys Val Val Gly
 1610 1615 1620
 Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
 1625 1630 1635
 Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
 1640 1645 1650
 Glu Asp Asp Ile Phe Arg Lys Lys Arg Leu Thr Ile Met Asp Leu
 1655 1660 1665
 His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
 1670 1675 1680
 Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
 1685 1690 1695

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Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
 1700 1705 1710
 Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Glu His Thr Gly
 1715 1720 1725
 Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
 1730 1735 1740
 Leu Leu Ser Pro Ile Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
 1745 1750 1755
 Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
 1760 1765 1770
 Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
 1775 1780 1785
 Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
 1790 1795 1800
 Asn Ala Pro Ile Met Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
 1805 1810 1815
 Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
 1820 1825 1830
 Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
 1835 1840 1845
 Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
 1850 1855 1860
 Thr Phe Asp Ser Glu Tyr Ile Lys Thr Arg Thr Asn Asp Trp Asp
 1865 1870 1875
 Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
 1880 1885 1890
 Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
 1895 1900 1905
 Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
 1910 1915 1920
 Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Val Gly Arg
 1925 1930 1935
 Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
 1940 1945 1950

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Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
 1955 1960 1965
 Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
 1970 1975 1980
 Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
 1985 1990 1995
 Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
 2000 2005 2010
 Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
 2015 2020 2025
 Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
 2030 2035 2040
 Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
 2045 2050 2055
 Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
 2060 2065 2070
 Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
 2075 2080 2085
 Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
 2090 2095 2100
 Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asn Ala Leu
 2105 2110 2115
 Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
 2120 2125 2130
 Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
 2135 2140 2145
 Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
 2150 2155 2160
 Phe Leu Met Ser Gly Lys Gly Ile Gly Lys Met Thr Leu Gly Met
 2165 2170 2175
 Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
 2180 2185 2190
 Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
 2195 2200 2205

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Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
 2210 2215 2220
 Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
 2225 2230 2235
 Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
 2240 2245 2250
 Lys Asp Phe Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
 2255 2260 2265
 Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
 2270 2275 2280
 Tyr Ala Val Ala Thr Thr Phe Ile Thr Pro Met Leu Arg His Ser
 2285 2290 2295
 Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
 2300 2305 2310
 Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
 2315 2320 2325
 Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
 2330 2335 2340
 Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Leu Leu Leu Leu Val
 2345 2350 2355
 Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
 2360 2365 2370
 Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
 2375 2380 2385
 Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
 2390 2395 2400
 Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
 2405 2410 2415
 Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
 2420 2425 2430
 Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
 2435 2440 2445
 Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
 2450 2455 2460

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Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
 2465 2470 2475
 Leu Phe Ser Ile Met Lys Asn Thr Ala Asn Thr Arg Arg Gly Thr
 2480 2485 2490
 Gly Asn Thr Gly Glu Thr Leu Gly Glu Lys Trp Lys Asn Arg Leu
 2495 2500 2505
 Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
 2510 2515 2520
 Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
 2525 2530 2535
 Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Lys Leu
 2540 2545 2550
 Arg Trp Phe Val Glu Arg Asn Leu Val Thr Pro Glu Gly Lys Val
 2555 2560 2565
 Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
 2570 2575 2580
 Gly Leu Lys Asn Val Lys Glu Val Lys Gly Leu Thr Lys Gly Gly
 2585 2590 2595
 Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
 2600 2605 2610
 Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Thr Pro Pro
 2615 2620 2625
 Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
 2630 2635 2640
 Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
 2645 2650 2655
 Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
 2660 2665 2670
 Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
 2675 2680 2685
 Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
 2690 2695 2700
 Asn Ser Thr His Glu Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
 2705 2710 2715

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Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
 2720 2725 2730
 Phe Thr Met Arg His Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
 2735 2740 2745
 Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Thr Pro
 2750 2755 2760
 Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
 2765 2770 2775
 His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
 2780 2785 2790
 Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
 2795 2800 2805
 Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp
 2810 2815 2820
 Asp Ile Ile Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
 2825 2830 2835
 Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
 2840 2845 2850
 Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
 2855 2860 2865
 Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
 2870 2875 2880
 Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
 2885 2890 2895
 Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
 2900 2905 2910
 Arg Glu Ala Val Glu Asp Ser Gly Phe Trp Glu Leu Val Asp Lys
 2915 2920 2925
 Glu Arg Asn Leu His Leu Glu Gly Lys Cys Glu Thr Cys Val Tyr
 2930 2935 2940
 Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys
 2945 2950 2955
 Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg
 2960 2965 2970

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Phe Leu Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp
 2975 2980 2985
 Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly Leu
 2990 2995 3000
 His Lys Leu Gly Tyr Ile Leu Arg Asp Val Ser Lys Lys Glu Gly
 3005 3010 3015
 Gly Ala Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile
 3020 3025 3030
 Thr Leu Glu Asp Leu Lys Asn Glu Glu Met Val Thr Asn His Met
 3035 3040 3045
 Glu Gly Glu His Lys Lys Leu Ala Glu Ala Ile Phe Lys Leu Thr
 3050 3055 3060
 Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Thr Pro Arg Gly
 3065 3070 3075
 Thr Val Met Asp Ile Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly
 3080 3085 3090
 Gln Val Val Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala
 3095 3100 3105
 Gln Leu Ile Arg Gln Met Glu Gly Glu Gly Val Phe Lys Ser Ile
 3110 3115 3120
 Gln His Leu Thr Val Thr Glu Glu Ile Ala Val Lys Asn Trp Leu
 3125 3130 3135
 Val Arg Val Gly Arg Glu Arg Leu Ser Arg Met Ala Ile Ser Gly
 3140 3145 3150
 Asp Asp Cys Val Val Lys Pro Leu Asp Asp Arg Phe Ala Ser Ala
 3155 3160 3165
 Leu Thr Ala Leu Asn Asp Met Gly Lys Val Arg Lys Asp Ile Gln
 3170 3175 3180
 Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
 3185 3190 3195
 Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
 3200 3205 3210
 Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
 3215 3220 3225

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Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
3230 3235 3240

Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
3245 3250 3255

His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
3260 3265 3270

Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
3275 3280 3285

His Ala Thr His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
3290 3295 3300

Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
3305 3310 3315

Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
3320 3325 3330

Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala
3335 3340 3345

Thr Trp Ala Lys Asn Ile Gln Thr Ala Ile Asn Gln Val Arg Ser
3350 3355 3360

Leu Ile Gly Asn Glu Glu Tyr Thr Asp Tyr Met Pro Ser Met Lys
3365 3370 3375

Arg Phe Arg Arg Glu Glu Glu Glu Ala Gly Val Leu Trp
3380 3385 3390

<210> 3

<211> 3390

<212> PRT

<213> Dengue virus type 3

<220>

<221> MISC_FEATURE

<222> (2491)..(3390)

<223> Non-structural protein 5 in DENV-3 D3MY05-34640 wildtype

<400> 3

Met Asn Asn Gln Arg Lys Lys Thr Gly Lys Pro Ser Ile Asn Met Leu
1 5 10 15

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

Phe Ser Arg Gly Leu Leu Asn Gly Gln Gly Pro Met Lys Leu Val Met
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35

40

45

Ala Phe Ile Ala Phe Leu Arg Phe Leu Ala Ile Pro Pro Thr Ala Gly
50 55 60

Ile Leu Ala Arg Trp Gly Thr Phe Lys Lys Ser Gly Ala Ile Lys Val
65 70 75 80

Leu Arg Gly Phe Lys Lys Glu Ile Ser Asn Met Leu Ser Ile Ile Asn
85 90 95

Arg Arg Lys Lys Thr Ser Leu Cys Leu Met Met Met Leu Pro Ala Thr
100 105 110

Leu Ala Phe His Leu Thr Ser Arg Asp Gly Glu Pro Arg Met Ile Val
115 120 125

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

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
145 150 155 160

Asp Thr Val Thr Tyr Lys Cys Pro Leu Ile Thr Glu Val Glu Pro Glu
165 170 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
180 185 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
195 200 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Ala Gln Thr Trp
210 215 220

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
225 230 235 240

Ala Phe Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
245 250 255

Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
260 265 270

Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
275 280 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
290 295 300

Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
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305 310 315 320

Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
325 330 335

Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Val Thr Thr Asp Ser
340 345 350

Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
355 360 365

Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
370 375 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
385 390 395 400

Cys Leu Glu Leu Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
405 410 415

Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
420 425 430

Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
435 440 445

Val Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
450 455 460

Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Leu Leu Thr Met Lys
465 470 475 480

Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
485 490 495

Pro Trp Thr Ser Gly Ala Thr Thr Glu Thr Pro Thr Trp Asn Lys Lys
500 505 510

Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
515 520 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
530 535 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
545 550 555 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
565 570 575

Tyr Ala Met Cys Ser Asn Ala Phe Val Leu Lys Lys Glu Val Ser Glu
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580

585

590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
595 600 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
610 615 620

His Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
625 630 635 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
645 650 655

Ile Ile Gly Thr Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
660 665 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
675 680 685

Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
690 695 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
705 710 715 720

Ala Tyr Thr Ala Leu Phe Ser Gly Val Ser Trp Ile Met Lys Ile Gly
725 730 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
740 745 750

Met Ser Phe Ser Cys Ile Val Ile Gly Ile Ile Thr Leu Tyr Leu Gly
755 760 765

Ala Val Val Gln Ala Asp Met Gly Cys Val Ile Asn Trp Lys Gly Lys
770 775 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Val Thr Asn Glu Val His Thr
785 790 795 800

Trp Thr Glu Gln Tyr Lys Phe Gln Ala Asp Ser Pro Lys Arg Leu Ala
805 810 815

Thr Ala Ile Ala Gly Ala Trp Glu Asn Gly Val Cys Gly Ile Arg Ser
820 825 830

Thr Thr Arg Met Glu Asn Leu Leu Trp Lys Gln Ile Ala Asn Glu Leu
835 840 845

Asn Tyr Ile Leu Trp Glu Asn Asn Ile Lys Leu Thr Val Val Val Gly
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850

855

860

Asp Ile Ile Gly Ile Leu Glu Gln Gly Lys Arg Thr Leu Thr Pro Gln
 865 870 875 880

Pro Met Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Ile
 885 890 895

Val Thr Ala Glu Ile Gln Asn Ser Ser Phe Ile Ile Asp Gly Pro Asn
 900 905 910

Thr Pro Glu Cys Pro Asn Ala Ser Arg Ala Trp Asn Val Trp Glu Val
 915 920 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
 930 935 940

Arg Glu Met Tyr Thr Gln Leu Cys Asp His Arg Leu Met Ser Ala Ala
 945 950 955 960

Val Lys Asp Glu Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
 965 970 975

Ser Gln Lys Asn Gly Ser Trp Lys Leu Glu Lys Ala Ser Leu Ile Glu
 980 985 990

Val Lys Thr Cys Thr Trp Pro Lys Ser His Thr Leu Trp Ser Asn Gly
 995 1000 1005

Val Leu Glu Ser Asp Met Ile Ile Pro Lys Ser Leu Ala Gly Pro
 1010 1015 1020

Ile Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln Thr Ala
 1025 1030 1035

Gly Pro Trp His Leu Gly Lys Leu Glu Leu Asp Phe Asn Tyr Cys
 1040 1045 1050

Glu Gly Thr Thr Val Val Ile Thr Glu Asn Cys Gly Thr Arg Gly
 1055 1060 1065

Pro Ser Leu Arg Thr Thr Thr Val Ser Gly Lys Leu Ile His Glu
 1070 1075 1080

Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr Met Gly
 1085 1090 1095

Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Ile Asn Glu
 1100 1105 1110

Lys Glu Glu Asn Met Val Lys Ser Leu Val Ser Ala Gly Ser Gly
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1115

1120

1125

Lys Val Asp Asn Phe Thr Met Gly Val Leu Cys Leu Ala Ile Leu
1130 1135 1140

Phe Glu Glu Val Met Arg Gly Lys Phe Gly Lys Lys His Met Ile
1145 1150 1155

Ala Gly Val Leu Phe Thr Phe Val Leu Leu Leu Ser Gly Gln Ile
1160 1165 1170

Thr Trp Arg Asp Met Ala Arg Thr Leu Ile Met Ile Gly Ser Asn
1175 1180 1185

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

Ala Thr Phe Lys Ile Gln Pro Phe Leu Ala Leu Gly Phe Phe Leu
1205 1210 1215

Arg Lys Leu Thr Ser Arg Glu Asn Leu Leu Leu Gly Val Gly Leu
1220 1225 1230

Ala Met Ala Thr Thr Leu Gln Leu Pro Glu Asp Ile Glu Gln Met
1235 1240 1245

Ala Asn Gly Ile Ala Leu Gly Leu Met Ala Leu Lys Leu Ile Thr
1250 1255 1260

Gln Phe Glu Thr Tyr Gln Leu Trp Thr Ala Leu Val Ser Leu Met
1265 1270 1275

Cys Ser Asn Thr Ile Phe Thr Leu Thr Val Ala Trp Arg Thr Ala
1280 1285 1290

Thr Leu Ile Leu Ala Gly Ile Ser Leu Leu Pro Val Cys Gln Ser
1295 1300 1305

Ser Ser Met Arg Lys Thr Asp Trp Leu Pro Met Thr Val Ala Ala
1310 1315 1320

Met Gly Val Pro Pro Leu Pro Leu Phe Ile Phe Ser Leu Lys Asp
1325 1330 1335

Thr Leu Lys Arg Arg Ser Trp Pro Leu Asn Glu Gly Val Met Ala
1340 1345 1350

Val Gly Leu Val Ser Ile Leu Ala Ser Ser Leu Leu Arg Asn Asp
1355 1360 1365

Val Pro Met Ala Gly Pro Leu Val Ala Gly Gly Leu Leu Ile Ala

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1370

1375

1380

Cys Tyr Val Ile Thr Gly Thr Ser Ala Asp Leu Thr Val Glu Lys
1385 1390 1395

Ala Ala Asp Val Thr Trp Glu Glu Glu Ala Glu Gln Thr Gly Val
1400 1405 1410

Ser His Asn Leu Met Ile Thr Val Asp Asp Asp Gly Thr Met Arg
1415 1420 1425

Ile Lys Asp Asp Glu Thr Glu Asn Ile Leu Thr Val Leu Leu Lys
1430 1435 1440

Thr Ala Leu Leu Ile Val Ser Gly Ile Phe Pro Tyr Ser Ile Pro
1445 1450 1455

Ala Thr Leu Leu Val Trp His Thr Trp Gln Lys Gln Thr Gln Arg
1460 1465 1470

Ser Gly Val Leu Trp Asp Val Pro Ser Pro Pro Glu Thr Gln Lys
1475 1480 1485

Ala Glu Leu Glu Glu Gly Val Tyr Arg Ile Lys Gln Gln Gly Ile
1490 1495 1500

Phe Gly Lys Thr Gln Val Gly Val Gly Val Gln Lys Glu Gly Val
1505 1510 1515

Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu Thr Tyr
1520 1525 1530

Asn Gly Lys Arg Leu Glu Pro Asn Trp Ala Ser Val Lys Lys Asp
1535 1540 1545

Leu Ile Ser Tyr Gly Gly Gly Trp Arg Leu Ser Ala Gln Trp Gln
1550 1555 1560

Lys Gly Glu Glu Val Gln Val Ile Ala Val Glu Pro Gly Lys Asn
1565 1570 1575

Pro Lys Asn Phe Gln Thr Met Pro Gly Ile Phe Gln Thr Thr Thr
1580 1585 1590

Gly Glu Ile Gly Ala Ile Ala Leu Asp Phe Lys Pro Gly Thr Ser
1595 1600 1605

Gly Ser Pro Ile Ile Asn Arg Glu Gly Lys Val Val Gly Leu Tyr
1610 1615 1620

Gly Asn Gly Val Val Thr Lys Asn Gly Gly Tyr Val Ser Gly Ile

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1625

1630

1635

Ala Gln Thr Asn Ala Glu Pro Asp Gly Pro Thr Pro Glu Leu Glu
1640 1645 1650

Glu Glu Met Phe Lys Lys Arg Asn Leu Thr Ile Met Asp Leu His
1655 1660 1665

Pro Gly Ser Gly Lys Thr Arg Lys Tyr Leu Pro Ala Ile Val Arg
1670 1675 1680

Glu Ala Ile Lys Arg Arg Leu Arg Thr Leu Ile Leu Ala Pro Thr
1685 1690 1695

Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Lys Gly Leu Pro
1700 1705 1710

Ile Arg Tyr Gln Thr Thr Ala Thr Lys Ser Glu His Thr Gly Lys
1715 1720 1725

Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg Leu
1730 1735 1740

Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met Asp
1745 1750 1755

Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly Tyr
1760 1765 1770

Ile Ser Thr Arg Val Gly Met Gly Glu Ala Ala Ala Ile Phe Met
1775 1780 1785

Thr Ala Thr Pro Pro Gly Thr Ala Asp Ala Phe Pro Gln Ser Asn
1790 1795 1800

Ala Pro Ile Gln Asp Glu Glu Arg Asp Ile Pro Glu Arg Ser Trp
1805 1810 1815

Asn Ser Gly Asn Asp Trp Ile Thr Asp Phe Ala Gly Lys Thr Val
1820 1825 1830

Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Asn Cys
1835 1840 1845

Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys Thr
1850 1855 1860

Phe Asp Thr Glu Tyr Gln Lys Thr Lys Leu Asn Asp Trp Asp Phe
1865 1870 1875

Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys Ala
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1880	1885	1890
Asp Arg Val Ile Asp Pro Arg Arg Cys Leu Lys Pro Val Ile Leu	1895	1900 1905
Thr Asp Gly Pro Glu Arg Val Ile Leu Ala Gly Pro Met Pro Val	1910	1915 1920
Thr Val Ala Ser Ala Ala Gln Arg Arg Gly Arg Val Gly Arg Asn	1925	1930 1935
Pro Gln Lys Glu Asn Asp Gln Tyr Ile Phe Thr Gly Gln Pro Leu	1940	1945 1950
Asn Asn Asp Glu Asp His Ala His Trp Thr Glu Ala Lys Met Leu	1955	1960 1965
Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ala Leu Phe	1970	1975 1980
Glu Pro Glu Arg Glu Lys Ser Ala Ala Ile Asp Gly Glu Tyr Arg	1985	1990 1995
Leu Lys Gly Glu Ser Arg Lys Thr Phe Val Glu Leu Met Arg Arg	2000	2005 2010
Gly Asp Leu Pro Val Trp Leu Ala His Lys Val Ala Ser Glu Gly	2015	2020 2025
Ile Lys Tyr Thr Asp Arg Lys Trp Cys Phe Asp Gly Glu Arg Asn	2030	2035 2040
Asn Gln Ile Leu Glu Glu Asn Met Asp Val Glu Ile Trp Thr Lys	2045	2050 2055
Glu Gly Glu Lys Lys Lys Leu Arg Pro Arg Trp Leu Asp Ala Arg	2060	2065 2070
Thr Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Asp Phe Ala	2075	2080 2085
Ala Gly Arg Lys Ser Ile Ala Leu Asp Leu Val Thr Glu Ile Gly	2090	2095 2100
Arg Val Pro Ser His Leu Ala His Arg Thr Arg Asn Ala Leu Asp	2105	2110 2115
Asn Leu Val Met Leu His Thr Ser Glu His Gly Gly Arg Ala Tyr	2120	2125 2130
Arg His Ala Val Glu Glu Leu Pro Glu Thr Met Glu Thr Leu Leu		

2140

2145

Val Asp Gly Ile Met Thr Ile Asp Leu Asp Pro Val Ile Tyr Asp
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2390

2395

2400

Ser Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val Leu
2405 2410 2415

Cys Ala Val Gln Leu Leu Leu Met Arg Thr Ser Trp Ala Phe Cys
2420 2425 2430

Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Thr Thr Leu Trp Glu
2435 2440 2445

Gly Ser Pro Gly Lys Phe Trp Asn Thr Thr Ile Ala Val Ser Met
2450 2455 2460

Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Ala
2465 2470 2475

Phe Ser Ile Met Lys Ser Val Gly Thr Gly Lys Arg Gly Thr Gly
2480 2485 2490

Ser Gln Gly Glu Thr Leu Gly Glu Lys Trp Lys Lys Lys Leu Asn
2495 2500 2505

Gln Leu Ser Trp Lys Glu Phe Asp Leu Tyr Lys Lys Ser Gly Ile
2510 2515 2520

Thr Glu Val Asp Arg Ile Glu Ala Lys Glu Gly Leu Lys Arg Gly
2525 2530 2535

Glu Ile Thr His His Ala Val Ser Arg Gly Ser Ala Lys Leu Gln
2540 2545 2550

Trp Phe Val Glu Arg Asn Met Val Ile Pro Glu Gly Arg Val Ile
2555 2560 2565

Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Ala Gly
2570 2575 2580

Leu Lys Lys Val Thr Glu Val Arg Gly Tyr Thr Lys Gly Gly Pro
2585 2590 2595

Gly His Glu Glu Pro Val Pro Met Ser Thr Tyr Gly Trp Asn Ile
2600 2605 2610

Val Lys Leu Met Ser Gly Lys Asp Val Phe Tyr Leu Pro Pro Glu
2615 2620 2625

Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro Ser
2630 2635 2640

Pro Thr Val Glu Glu Ser Arg Thr Ile Arg Val Leu Lys Met Val
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2645

2650

2655

Glu Pro Trp Leu Lys Asn Asn Gln Phe Cys Ile Lys Val Leu Asn
2660 2665 2670

Pro Tyr Met Pro Ala Val Ile Glu His Leu Glu Arg Leu Gln Arg
2675 2680 2685

Lys His Gly Gly Met Leu Val Arg Asn Pro Leu Ser Arg Asn Ser
2690 2695 2700

Thr His Glu Met Tyr Trp Ile Ser Asn Gly Thr Gly Asn Ile Val
2705 2710 2715

Ser Ser Val Asn Met Val Ser Arg Leu Leu Leu Asn Arg Phe Thr
2720 2725 2730

Met Thr Tyr Arg Lys Pro Thr Ile Glu Lys Asp Val Asp Leu Gly
2735 2740 2745

Ala Gly Thr Arg His Val Asn Ala Glu Pro Glu Thr Pro Asn Met
2750 2755 2760

Asp Val Ile Gly Glu Arg Ile Arg Arg Ile Lys Glu Glu His Ser
2765 2770 2775

Ser Thr Trp His Tyr Asp Asp Glu Asn Pro Tyr Lys Thr Trp Ala
2780 2785 2790

Tyr His Gly Ser Tyr Glu Val Lys Ala Thr Gly Ser Ala Ser Ser
2795 2800 2805

Met Ile Asn Gly Val Val Lys Leu Leu Thr Lys Pro Trp Asp Val
2810 2815 2820

Val Pro Thr Val Thr Gln Met Ala Met Thr Asp Thr Thr Pro Phe
2825 2830 2835

Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Pro
2840 2845 2850

Lys Pro Met Pro Gly Thr Arg Lys Val Met Glu Ile Thr Ala Glu
2855 2860 2865

Trp Leu Trp Arg Thr Leu Gly Arg Asn Lys Arg Pro Arg Leu Cys
2870 2875 2880

Thr Arg Glu Glu Phe Thr Lys Lys Val Arg Thr Asn Ala Ala Met
2885 2890 2895

Gly Ala Val Phe Thr Glu Glu Asn Gln Trp Asp Ser Ala Arg Ala
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2900

2905

2910

Ala Val Glu Asp Glu Glu Phe Trp Lys Leu Val Asp Arg Glu Arg
 2915 2920 2925
 Glu Leu His Lys Leu Gly Lys Cys Gly Ser Cys Val Tyr Asn Met
 2930 2935 2940
 Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys Ala Lys
 2945 2950 2955
 Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Tyr Leu
 2960 2965 2970
 Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser
 2975 2980 2985
 Arg Glu Asn Ser Tyr Ser Gly Val Glu Gly Glu Gly Leu His Lys
 2990 2995 3000
 Leu Gly Tyr Ile Leu Arg Asp Ile Ser Lys Ile Pro Gly Gly Ala
 3005 3010 3015
 Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Glu
 3020 3025 3030
 Asp Asp Leu His Asn Glu Glu Lys Ile Thr Gln Gln Met Asp Pro
 3035 3040 3045
 Glu His Arg Gln Leu Ala Asn Ala Ile Phe Lys Leu Thr Tyr Gln
 3050 3055 3060
 Asn Lys Val Val Lys Val Gln Arg Pro Thr Pro Lys Gly Thr Val
 3065 3070 3075
 Met Asp Ile Ile Ser Arg Lys Asp Gln Arg Gly Ser Gly Gln Val
 3080 3085 3090
 Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala Gln Leu
 3095 3100 3105
 Ile Arg Gln Met Glu Gly Glu Gly Val Leu Ser Lys Thr Asp Leu
 3110 3115 3120
 Glu Asn Pro His Leu Leu Glu Lys Lys Ile Thr Gln Trp Leu Glu
 3125 3130 3135
 Thr Lys Gly Val Glu Arg Leu Lys Arg Met Ala Ile Ser Gly Asp
 3140 3145 3150
 Asp Cys Val Val Lys Pro Ile Asp Asp Arg Phe Ala Asn Ala Leu

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3155

3160

3165

Leu Ala Leu Asn Asp Met Gly Lys Val Arg Lys Asp Ile Pro Gln
 3170 3175 3180

Trp Gln Pro Ser Lys Gly Trp Gln Asp Trp Gln Gln Val Pro Phe
 3185 3190 3195

Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg Lys
 3200 3205 3210

Leu Val Val Pro Cys Arg Pro Gln Asp Glu Leu Ile Gly Arg Ala
 3215 3220 3225

Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Lys Glu Thr Ala Cys
 3230 3235 3240

Leu Gly Lys Ala Tyr Ala Gln Met Trp Ala Leu Met Tyr Phe His
 3245 3250 3255

Arg Arg Asp Leu Arg Leu Ala Ser Asn Ala Ile Cys Ser Ala Val
 3260 3265 3270

Pro Val His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile His
 3275 3280 3285

Ala His His Gln Trp Met Thr Thr Glu Asp Met Leu Thr Val Trp
 3290 3295 3300

Asn Arg Val Trp Ile Glu Asp Asn Pro Trp Met Glu Asp Lys Thr
 3305 3310 3315

Pro Val Thr Thr Trp Glu Asp Val Pro Tyr Leu Gly Lys Arg Glu
 3320 3325 3330

Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala Thr
 3335 3340 3345

Trp Ala Gln Asn Ile Leu Thr Ala Ile Gln Gln Val Arg Ser Leu
 3350 3355 3360

Ile Gly Asn Glu Glu Phe Leu Asp Tyr Met Pro Ser Met Lys Arg
 3365 3370 3375

Phe Arg Lys Glu Glu Glu Ser Glu Gly Ala Ile Trp
 3380 3385 3390

<210> 4

<211> 3387

<212> PRT

<213> Dengue virus type 4

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<220>
 <221> MISC_FEATURE
 <222> (2488)..(3387)
 <223> Non-structural protein 5 (NS5) in DENV-4 D4MY01-22713 wildtype

<400> 4

Met Asn Gln Arg Lys Lys Val Val Arg Pro Pro Phe Asn Met Leu Lys
 1 5 10 15

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

Ser Thr Gly Leu Phe Ser Gly Lys Gly Pro Leu Arg Met Val Leu Ala
 35 40 45

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

Leu Lys Arg Trp Gly Gln Leu Lys Lys Asn Lys Ala Ile Lys Ile Leu
 65 70 75 80

Ile Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn Arg
 85 90 95

Arg Arg Arg Ser Thr Met Thr Leu Leu Cys Leu Ile Pro Thr Val Met
 100 105 110

Ala Phe His Leu Ser Thr Arg Asp Gly Glu Pro Leu Met Ile Val Ala
 115 120 125

Lys His Glu Arg Gly Arg Pro Leu Leu Phe Lys Thr Thr Glu Gly Ile
 130 135 140

Asn Lys Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Glu Asp
 145 150 155 160

Thr Val Thr Tyr Lys Cys Pro Leu Leu Val Asn Thr Glu Pro Glu Asp
 165 170 175

Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Met Tyr Gly Thr
 180 185 190

Cys Thr Gln Ser Gly Glu Arg Arg Arg Glu Lys Arg Ser Val Ala Leu
 195 200 205

Thr Pro His Ser Gly Met Gly Leu Glu Thr Arg Ala Glu Thr Trp Met
 210 215 220

Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Val Glu Ser Trp Ile
 225 230 235 240

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Leu Arg Asn Pro Gly Phe Ala Leu Leu Ala Gly Phe Met Ala Tyr Met
 245 250 255

Ile Gly Gln Thr Gly Ile Gln Arg Thr Val Phe Phe Val Leu Met Met
 260 265 270

Leu Val Ala Pro Ser Tyr Gly Met Arg Cys Val Gly Val Gly Asn Arg
 275 280 285

Asp Phe Val Glu Gly Val Ser Gly Gly Ala Trp Val Asp Leu Val Leu
 290 295 300

Glu His Gly Gly Cys Val Thr Thr Met Ala Gln Gly Lys Pro Thr Leu
 305 310 315 320

Asp Phe Glu Leu Thr Lys Thr Thr Ala Lys Glu Val Ala Leu Leu Arg
 325 330 335

Thr Tyr Cys Ile Glu Ala Ser Ile Ser Asn Ile Thr Thr Ala Thr Arg
 340 345 350

Cys Pro Thr Gln Gly Glu Pro Tyr Leu Lys Glu Glu Gln Asp Gln Gln
 355 360 365

Tyr Ile Cys Arg Arg Asp Val Val Asp Arg Gly Trp Gly Asn Gly Cys
 370 375 380

Gly Leu Phe Gly Lys Gly Gly Val Val Thr Cys Ala Lys Phe Ser Cys
 385 390 395 400

Ser Gly Lys Ile Thr Gly Asn Leu Val Gln Ile Glu Asn Leu Glu Tyr
 405 410 415

Thr Val Val Val Thr Val His Asn Gly Asp Thr His Ala Val Gly Asn
 420 425 430

Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser Pro
 435 440 445

Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp Cys
 450 455 460

Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys Met
 465 470 475 480

Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu Pro
 485 490 495

Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn Tyr
 500 505 510

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Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln Asp
 515 520 525

Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu Ala
 530 535 540

Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala Gly
 545 550 555 560

His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly Met
 565 570 575

Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met Ala
 580 585 590

Glu Thr Gln His Gly Thr Ala Val Val Lys Val Lys Tyr Glu Gly Ala
 595 600 605

Gly Ala Pro Cys Lys Ile Pro Ile Glu Ile Arg Asp Val Asn Lys Glu
 610 615 620

Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Phe Ala Glu Asn Thr
 625 630 635 640

Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser Tyr
 645 650 655

Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe Arg
 660 665 670

Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly Ala
 675 680 685

Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser Val
 690 695 700

Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe Gly
 705 710 715 720

Ser Val Tyr Thr Thr Met Phe Gly Gly Val Ser Trp Ile Ile Arg Ile
 725 730 735

Leu Ile Gly Leu Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn Thr
 740 745 750

Ser Met Ala Met Thr Cys Ile Ala Val Gly Gly Ile Thr Leu Phe Leu
 755 760 765

Gly Phe Thr Val Gln Ala Asp Met Gly Cys Val Val Ser Trp Asn Gly
 770 775 780

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Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Val Val Asp Asn Val His
785 790 795 800

Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ala Arg Leu
805 810 815

Ala Ser Ala Ile Leu Asn Ala His Lys Asp Gly Val Cys Gly Ile Arg
820 825 830

Ser Thr Thr Arg Leu Glu Asn Val Met Trp Lys Gln Ile Thr Asn Glu
835 840 845

Leu Asn Tyr Val Leu Trp Glu Gly Gly His Asp Leu Thr Val Val Ala
850 855 860

Gly Asp Val Lys Gly Val Leu Thr Lys Gly Lys Arg Ala Leu Thr Pro
865 870 875 880

Pro Val Asn Asp Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys
885 890 895

Ile Phe Thr Pro Glu Ala Arg Asn Ser Thr Phe Leu Ile Asp Gly Pro
900 905 910

Asp Thr Ser Glu Cys Pro Asn Glu Arg Arg Ala Trp Asn Phe Phe Glu
915 920 925

Val Glu Asp Tyr Gly Phe Gly Met Phe Thr Thr Asn Ile Trp Met Lys
930 935 940

Phe Arg Glu Gly Ser Ser Glu Val Cys Asp His Arg Leu Met Ser Ala
945 950 955 960

Ala Ile Lys Asp Gln Lys Ala Val His Ala Asp Met Gly Tyr Trp Ile
965 970 975

Glu Ser Ser Lys Asn Gln Thr Trp Gln Ile Glu Lys Ala Ser Leu Ile
980 985 990

Glu Val Lys Thr Cys Leu Trp Pro Lys Thr His Thr Leu Trp Ser Asn
995 1000 1005

Gly Val Leu Glu Ser Gln Met Leu Ile Pro Arg Ser Tyr Ala Gly
1010 1015 1020

Pro Phe Ser Gln His Asn Tyr Arg Gln Gly Tyr Ala Thr Gln Thr
1025 1030 1035

Val Gly Pro Trp His Leu Gly Lys Leu Glu Ile Asp Phe Gly Glu
1040 1045 1050

9869SG2164 Sequence listings_ST25.txt

Cys Pro Gly Thr Thr Val Thr Ile Gln Glu Asp Cys Asp His Arg
 1055 1060 1065
 Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Val Thr
 1070 1075 1080
 Gln Trp Cys Cys Arg Ser Cys Thr Met Pro Pro Leu Arg Phe Leu
 1085 1090 1095
 Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu Ser
 1100 1105 1110
 Glu Lys Glu Glu Asn Met Val Lys Ser Gln Val Thr Ala Gly Gln
 1115 1120 1125
 Gly Thr Ser Glu Thr Phe Ser Met Gly Leu Leu Cys Leu Thr Leu
 1130 1135 1140
 Phe Val Glu Glu Cys Leu Arg Arg Arg Val Thr Arg Lys His Met
 1145 1150 1155
 Ile Leu Val Val Val Ile Thr Phe Cys Ala Ile Ile Leu Gly Gly
 1160 1165 1170
 Leu Thr Trp Met Asp Leu Leu Arg Ala Leu Ile Met Leu Gly Asp
 1175 1180 1185
 Thr Met Ser Gly Arg Ile Gly Gly Gln Ile His Leu Ala Ile Met
 1190 1195 1200
 Ala Val Phe Lys Met Ser Pro Gly Tyr Val Leu Gly Val Phe Leu
 1205 1210 1215
 Arg Lys Leu Thr Ser Arg Glu Thr Ala Leu Met Val Ile Gly Met
 1220 1225 1230
 Ala Met Thr Thr Val Phe Ser Ile Pro His Asp Leu Met Glu Leu
 1235 1240 1245
 Ile Asp Gly Ile Ser Leu Gly Leu Ile Leu Leu Lys Ile Val Thr
 1250 1255 1260
 His Phe Asp Asn Thr Gln Val Gly Thr Leu Ala Leu Ser Leu Thr
 1265 1270 1275
 Phe Ile Arg Ser Thr Thr Pro Leu Val Met Ala Trp Arg Thr Ile
 1280 1285 1290
 Met Ala Val Phe Phe Val Val Thr Leu Ile Pro Leu Cys Arg Thr
 1295 1300 1305

9869SG2164 Sequence listings_ST25.txt

Ser Cys Leu Gln Lys Gln Ser His Trp Val Glu Ile Thr Ala Leu
 1310 1315 1320
 Ile Leu Gly Ala Gln Ala Leu Pro Val Tyr Leu Met Thr Leu Met
 1325 1330 1335
 Lys Gly Ala Ser Arg Arg Ser Trp Pro Leu Asn Glu Gly Ile Met
 1340 1345 1350
 Ala Val Gly Leu Val Ser Leu Leu Gly Ser Ala Leu Leu Lys Asn
 1355 1360 1365
 Asp Val Pro Leu Ala Gly Pro Met Val Ala Gly Gly Leu Leu Leu
 1370 1375 1380
 Ala Ala Tyr Val Met Ser Gly Ser Ser Ala Asp Leu Ser Leu Glu
 1385 1390 1395
 Lys Ala Ala Asn Val Gln Trp Asp Glu Met Ala Asp Ile Thr Gly
 1400 1405 1410
 Ser Ser Pro Ile Ile Glu Val Lys Gln Asp Glu Asp Gly Ser Phe
 1415 1420 1425
 Ser Ile Arg Asp Val Glu Glu Thr Asn Met Ile Thr Leu Leu Val
 1430 1435 1440
 Lys Leu Ala Leu Ile Thr Val Ser Gly Leu Tyr Pro Leu Ala Ile
 1445 1450 1455
 Pro Val Thr Met Ala Leu Trp Tyr Ile Trp Gln Val Lys Thr Gln
 1460 1465 1470
 Arg Ser Gly Ala Leu Trp Asp Val Pro Ser Pro Ala Ala Thr Gln
 1475 1480 1485
 Lys Ala Thr Leu Ser Glu Gly Val Tyr Arg Ile Met Gln Arg Gly
 1490 1495 1500
 Leu Phe Gly Lys Thr Gln Val Gly Val Gly Ile His Met Glu Gly
 1505 1510 1515
 Val Phe His Thr Met Trp His Val Thr Arg Gly Ser Val Ile Cys
 1520 1525 1530
 His Glu Thr Gly Arg Leu Glu Pro Ser Trp Ala Asp Val Arg Asn
 1535 1540 1545
 Asp Met Ile Ser Tyr Gly Gly Gly Trp Arg Leu Gly Asp Lys Trp
 1550 1555 1560

9869SG2164 Sequence listings_ST25.txt

Asp Lys Glu Glu Asp Val Gln Val Leu Ala Ile Glu Pro Gly Lys
 1565 1570 1575
 Asn Pro Lys His Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Leu
 1580 1585 1590
 Thr Gly Glu Ile Gly Ala Val Thr Leu Asp Phe Lys Pro Gly Thr
 1595 1600 1605
 Ser Gly Ser Pro Ile Ile Asn Lys Lys Gly Lys Val Ile Gly Leu
 1610 1615 1620
 Tyr Gly Asn Gly Val Val Thr Lys Ser Gly Asp Tyr Val Ser Ala
 1625 1630 1635
 Ile Thr Gln Ala Glu Arg Ile Gly Glu Pro Asp Tyr Glu Val Asp
 1640 1645 1650
 Glu Asp Ile Phe Arg Lys Lys Arg Leu Thr Ile Met Asp Leu His
 1655 1660 1665
 Pro Gly Ala Gly Lys Thr Lys Arg Ile Leu Pro Ser Ile Val Arg
 1670 1675 1680
 Glu Ala Leu Lys Arg Arg Leu Arg Thr Leu Ile Leu Ala Pro Thr
 1685 1690 1695
 Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro
 1700 1705 1710
 Ile Arg Tyr Gln Thr Pro Ala Val Lys Ser Asp His Thr Gly Arg
 1715 1720 1725
 Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Thr Arg Leu
 1730 1735 1740
 Leu Ser Ser Thr Arg Val Pro Asn Tyr Asn Leu Ile Val Met Asp
 1745 1750 1755
 Glu Ala His Phe Thr Asp Pro Cys Ser Val Ala Ala Arg Gly Tyr
 1760 1765 1770
 Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Ala Ile Phe Met
 1775 1780 1785
 Thr Ala Thr Pro Pro Gly Ser Ile Asp Pro Phe Pro Gln Ser Asn
 1790 1795 1800
 Ser Pro Ile Glu Asp Ile Glu Arg Glu Ile Pro Glu Arg Ser Trp
 1805 1810 1815

9869SG2164 Sequence listings_ST25.txt

Asn Thr Gly Phe Asp Trp Ile Thr Asp Tyr Gln Gly Lys Thr Val
 1820 1825 1830
 Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Asn Cys
 1835 1840 1845
 Leu Arg Lys Ser Gly Lys Arg Val Ile Gln Leu Ser Arg Lys Thr
 1850 1855 1860
 Phe Asp Thr Glu Tyr Pro Lys Thr Lys Leu Thr Asp Trp Asp Phe
 1865 1870 1875
 Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Arg Ala
 1880 1885 1890
 Gly Arg Val Ile Asp Pro Arg Arg Cys Leu Lys Pro Val Ile Leu
 1895 1900 1905
 Thr Asp Gly Pro Glu Arg Val Ile Leu Ala Gly Pro Ile Pro Val
 1910 1915 1920
 Thr Pro Ala Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn
 1925 1930 1935
 Pro Ala Gln Glu Asp Asp Gln Tyr Val Phe Ser Gly Asp Pro Leu
 1940 1945 1950
 Lys Asn Asp Glu Asp His Ala His Trp Thr Glu Ala Lys Met Leu
 1955 1960 1965
 Leu Asp Asn Ile Tyr Thr Pro Glu Gly Ile Ile Pro Thr Leu Phe
 1970 1975 1980
 Gly Pro Glu Arg Glu Lys Thr Gln Ala Ile Asp Gly Glu Phe Arg
 1985 1990 1995
 Leu Arg Gly Glu Gln Arg Lys Thr Phe Val Glu Leu Met Arg Arg
 2000 2005 2010
 Gly Asp Leu Pro Val Trp Leu Ser Tyr Lys Val Ala Ser Ala Gly
 2015 2020 2025
 Ile Ser Tyr Lys Asp Arg Glu Trp Cys Phe Thr Gly Glu Arg Asn
 2030 2035 2040
 Asn Gln Ile Leu Glu Glu Asn Met Glu Val Glu Ile Trp Thr Arg
 2045 2050 2055
 Glu Gly Glu Lys Lys Lys Leu Arg Pro Lys Trp Leu Asp Ala Arg
 2060 2065 2070

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Val Tyr Ala Asp Pro Met Ala Leu Lys Asp Phe Lys Glu Phe Ala
 2075 2080 2085
 Ser Gly Arg Lys Ser Ile Thr Leu Asp Ile Leu Thr Glu Ile Ala
 2090 2095 2100
 Thr Leu Pro Thr Tyr Leu Ser Ser Lys Ala Lys Leu Ala Leu Asp
 2105 2110 2115
 Asn Ile Val Met Leu His Thr Thr Glu Lys Gly Gly Arg Ala Tyr
 2120 2125 2130
 Gln His Ala Leu Asn Glu Leu Pro Glu Ser Leu Glu Thr Leu Met
 2135 2140 2145
 Leu Val Ala Leu Leu Gly Ala Met Thr Ala Gly Ile Phe Leu Phe
 2150 2155 2160
 Phe Met Gln Gly Lys Gly Ile Gly Lys Leu Ser Met Gly Leu Ile
 2165 2170 2175
 Ala Ile Ala Val Ala Ser Gly Leu Leu Trp Val Ala Glu Ile Gln
 2180 2185 2190
 Pro Gln Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu Met
 2195 2200 2205
 Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln Asp
 2210 2215 2220
 Asn Gln Leu Ile Tyr Val Ile Leu Thr Ile Leu Thr Ile Ile Gly
 2225 2230 2235
 Leu Ile Ala Ala Asn Glu Met Gly Leu Ile Glu Lys Thr Lys Thr
 2240 2245 2250
 Asp Phe Gly Phe Tyr Gln Val Lys Thr Glu Thr Thr Ile Leu Asp
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 Val Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu Tyr Ala Val Ala
 2270 2275 2280
 Thr Thr Ile Leu Thr Pro Met Leu Arg His Thr Ile Glu Asn Thr
 2285 2290 2295
 Ser Ala Asn Leu Ser Leu Ala Ala Ile Ala Asn Gln Ala Ala Val
 2300 2305 2310
 Leu Met Gly Leu Gly Lys Gly Trp Pro Leu His Arg Met Asp Leu
 2315 2320 2325

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Gly Val Pro Leu Leu Ala Met Gly Cys Tyr Ser Gln Val Asn Pro
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 Thr Thr Leu Thr Ala Ser Leu Val Met Leu Leu Val His Tyr Ala
 2345 2350 2355
 Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr Arg Glu Ala Gln
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 Lys Arg Thr Ala Ala Gly Ile Met Lys Asn Pro Thr Val Asp Gly
 2375 2380 2385
 Ile Thr Val Ile Asp Leu Glu Pro Ile Ser Tyr Asp Pro Lys Phe
 2390 2395 2400
 Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val Leu Cys Val Gly
 2405 2410 2415
 Gln Leu Leu Leu Met Arg Thr Thr Trp Ala Leu Cys Glu Val Leu
 2420 2425 2430
 Thr Leu Ala Thr Gly Pro Ile Met Thr Leu Trp Glu Gly Asn Pro
 2435 2440 2445
 Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser Thr Ala Asn Ile
 2450 2455 2460
 Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Ala Phe Ser Leu
 2465 2470 2475
 Ile Lys Asn Val Gln Thr Pro Arg Arg Gly Thr Gly Thr Thr Gly
 2480 2485 2490
 Glu Thr Leu Gly Glu Lys Trp Lys Arg Gln Leu Asn Ser Leu Asp
 2495 2500 2505
 Arg Lys Glu Phe Glu Glu Tyr Lys Arg Ser Gly Ile Leu Glu Val
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 Asp Arg Thr Glu Ala Lys Ser Ala Leu Arg Asp Gly Ser Lys Ile
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 Lys His Ala Val Ser Arg Gly Ser Ser Lys Ile Arg Trp Ile Val
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 Glu Arg Gly Met Ile Lys Pro Lys Gly Lys Val Val Asp Leu Gly
 2555 2560 2565
 Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Met Ala Thr Leu Lys Asn
 2570 2575 2580

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 Glu Pro Ile Pro Met Ala Thr Tyr Gly Trp Asn Leu Val Lys Leu
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 His Ser Gly Val Asp Val Phe Tyr Lys Pro Thr Glu Gln Val Asp
 2615 2620 2625
 Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Ser Asn Pro Thr Ile
 2630 2635 2640
 Glu Glu Gly Arg Thr Leu Arg Val Leu Lys Met Val Glu Pro Trp
 2645 2650 2655
 Leu Ser Ser Lys Pro Glu Phe Cys Ile Lys Val Leu Asn Pro Tyr
 2660 2665 2670
 Met Pro Thr Val Ile Glu Glu Leu Glu Lys Leu Gln Arg Arg His
 2675 2680 2685
 Gly Gly Ser Leu Val Arg Cys Pro Leu Ser Arg Asn Ser Thr His
 2690 2695 2700
 Glu Met Tyr Trp Val Ser Gly Ala Ser Gly Asn Ile Val Ser Ser
 2705 2710 2715
 Val Asn Thr Ile Ser Lys Met Leu Leu Asn Arg Phe Thr Thr Arg
 2720 2725 2730
 His Arg Lys Pro Thr Tyr Glu Lys Asp Val Asp Leu Gly Ala Gly
 2735 2740 2745
 Thr Arg Ser Val Ser Thr Glu Thr Glu Lys Pro Asp Met Thr Ile
 2750 2755 2760
 Ile Gly Arg Arg Leu Gln Arg Leu Arg Glu Glu His Lys Glu Thr
 2765 2770 2775
 Trp His Tyr Asp Gln Glu Asn Pro Tyr Arg Thr Trp Ala Tyr His
 2780 2785 2790
 Gly Ser Tyr Glu Ala Pro Ser Thr Gly Ser Ala Ser Ser Met Val
 2795 2800 2805
 Asn Gly Val Val Lys Leu Leu Thr Lys Pro Trp Asp Val Ile Pro
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 Met Val Thr Gln Leu Ala Met Thr Asp Thr Thr Pro Phe Gly Gln
 2825 2830 2835

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Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Pro Gln Pro
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 Lys Pro Gly Thr Arg Met Ile Met Thr Thr Thr Ala Asn Trp Leu
 2855 2860 2865

 Trp Ala Leu Leu Gly Lys Lys Lys Asn Pro Arg Leu Cys Thr Arg
 2870 2875 2880

 Glu Glu Phe Ile Ser Lys Val Arg Ser Asn Ala Ala Ile Gly Ala
 2885 2890 2895

 Val Phe Gln Glu Glu Gln Gly Trp Thr Ser Ala Ser Glu Ala Val
 2900 2905 2910

 Asn Asp Ser Arg Phe Trp Glu Leu Val Asp Lys Glu Arg Ala Leu
 2915 2920 2925

 His Gln Glu Gly Lys Cys Glu Ser Cys Val Tyr Asn Met Met Gly
 2930 2935 2940

 Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Arg Ala Lys Gly Ser
 2945 2950 2955

 Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Phe Leu Glu Phe
 2960 2965 2970

 Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser Arg Glu
 2975 2980 2985

 Asn Ser Trp Ser Gly Val Glu Gly Glu Gly Leu His Arg Leu Gly
 2990 2995 3000

 Tyr Ile Leu Glu Asp Ile Asp Lys Lys Asp Gly Asp Leu Ile Tyr
 3005 3010 3015

 Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Glu Asp Asp
 3020 3025 3030

 Leu Leu Asn Glu Glu Leu Ile Thr Glu Gln Met Ala Pro His His
 3035 3040 3045

 Lys Thr Leu Ala Lys Ala Ile Phe Lys Leu Thr Tyr Gln Asn Lys
 3050 3055 3060

 Val Val Lys Val Leu Arg Pro Thr Pro Lys Gly Ala Val Met Asp
 3065 3070 3075

 Ile Ile Ser Arg Lys Asp Gln Arg Gly Ser Gly Gln Val Gly Thr
 3080 3085 3090

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 Gln Met Glu Ala Glu Gly Val Ile Thr Gln Asp Asp Met Gln Asn
 3110 3115 3120
 Pro Lys Gly Leu Lys Glu Arg Val Glu Lys Trp Leu Lys Glu Cys
 3125 3130 3135
 Gly Val Asp Arg Leu Lys Arg Met Ala Ile Ser Gly Asp Asp Cys
 3140 3145 3150
 Val Val Lys Pro Leu Asp Glu Arg Phe Ser Thr Ser Leu Leu Phe
 3155 3160 3165
 Leu Asn Asp Met Gly Lys Val Arg Lys Asp Ile Pro Gln Trp Glu
 3170 3175 3180
 Pro Ser Lys Gly Trp Lys Asn Trp Gln Glu Val Pro Phe Cys Ser
 3185 3190 3195
 His His Phe His Lys Ile Phe Met Lys Asp Gly Arg Ser Leu Val
 3200 3205 3210
 Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg Ala Arg Ile
 3215 3220 3225
 Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala Cys Leu Gly
 3230 3235 3240
 Lys Ala Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe His Arg Arg
 3245 3250 3255
 Asp Leu Arg Leu Ala Ser Met Ala Ile Cys Ser Ala Val Pro Thr
 3260 3265 3270
 Glu Trp Phe Pro Thr Ser Arg Thr Thr Trp Ser Ile His Ala His
 3275 3280 3285
 His Gln Trp Met Thr Thr Glu Asp Met Leu Lys Val Trp Asn Arg
 3290 3295 3300
 Val Trp Ile Glu Asp Asn Pro Asn Met Thr Asp Lys Thr Pro Val
 3305 3310 3315
 His Ser Trp Glu Asp Ile Pro Tyr Leu Gly Lys Arg Glu Asp Leu
 3320 3325 3330
 Trp Cys Gly Ser Leu Ile Gly Leu Ser Ser Arg Ala Thr Trp Ala
 3335 3340 3345

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Lys Asn Ile His Thr Ala Ile Thr Gln Val Arg Asn Leu Ile Gly
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Lys Glu Glu Tyr Val Asp Tyr Met Pro Val Met Lys Arg Tyr Ser
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Ala Pro Ser Glu Ser Glu Gly Val Leu
 3380 3385

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 <213> Dengue virus type 1

<220>
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 <222> (7574)..(10270)
 <223> Non-structural protein 5 sequence in Dengue virus type 1 clone
 WestPac, complete genome (gi 1854036; gb U88535.1; DVU88535)

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 tcgaccgtct ttcaatatgc tgaaacgcgc gagaaaccgc gtgtcaactg tttcacagtt 180
 ggcgaagaga ttctcaaaag gattgctttc aggccaagga cccatgaaat tggatgatggc 240
 ttttatagca ttcttaagat ttctagccat acctccaaca gcaggaattt tggctagatg 300
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9869SG2164 sequence listings-ST25.txt
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FN429918.1)

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D4MY01-22713, genomic RNA, complete genome (gi 255031234; emb
FN429920.1)

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 9840 agaattctgc aggggcttgg atggagctta agggaaaacag cctgtcttgg caaagcttac
 9900 gccagatgt ggttcgttat gtacttccat agaagggacc tgcgttttagc ctccatggcc
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 10020 gttcatcacc agtggatgac catgaagac atgcttaag tgtggaacag agtgttgata
 10080 gaagacaacc ccaatatgac tgacaagact ccagtccatt cgtgggaaga cataccttac
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 10380 ctgagcaaa ccgtgtctgc tgtagctccg ccaataatgg gaggcgttaa attcccaggg
 10440 aggcctatcg ccacgggaagc tgtacgcttg gcataattga ctacggtta gaggaagccc
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 10560 ctgttggaa gactagaggt tagagagagc ccccccaaca caaaaacagc atatgacgc
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10652

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 <212> PRT
 <213> Dengue virus type 1

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 <222> (2494)..(3389)
 <223> Non-structural protein 5 in DENV-1 Westpac74 MT mutant passage 10

<220>
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 <222> (2554)..(2554)
 <223> Mutation from Lys to Ala

<220>
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 <222> (2709)..(2709)
 <223> Mutation of Glu to Ala

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

Phe Ser Lys Gly Leu Leu Ser Gly Gln Gly Pro Met Lys Leu Val Met
 35 40 45

Ala Phe Ile Ala Phe Leu Arg Phe Leu Ala Ile Pro Pro Thr Ala Gly
 50 55 60

Ile Leu Ala Arg Trp Gly Ser Phe Lys Lys Asn Gly Ala Ile Lys Val
 65 70 75 80

Leu Arg Gly Phe Lys Lys Glu Ile Ser Asn Met Leu Asn Ile Met Asn
 85 90 95

Arg Arg Lys Arg Ser Val Thr Met Leu Leu Met Leu Leu Pro Thr Ala
 100 105 110

Leu Ala Phe His Leu Thr Thr Arg Gly Gly Glu Pro His Met Ile Val
 115 120 125

Ser Lys Gln Glu Arg Gly Lys Ser Leu Leu Phe Lys Thr Ser Ala Gly
 130 135 140

Val Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Leu Cys Glu
 145 150 155 160

Asp Thr Met Thr Tyr Lys Cys Pro Arg Ile Thr Glu Thr Glu Pro Asp
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165

170

175

Asp Val Asp Cys Trp Cys Asn Ala Thr Glu Thr Trp Val Thr Tyr Gly
 180 185 190

Thr Cys Ser Gln Thr Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
 195 200 205

Leu Ala Pro His Val Gly Leu Gly Leu Glu Thr Arg Thr Glu Thr Trp
 210 215 220

Met Ser Ser Glu Gly Ala Trp Lys Gln Ile Gln Lys Val Glu Thr Trp
 225 230 235 240

Ala Leu Arg His Pro Gly Phe Thr Val Ile Ala Leu Phe Leu Ala His
 245 250 255

Ala Ile Gly Thr Ser Ile Thr Gln Lys Gly Ile Ile Phe Ile Leu Leu
 260 265 270

Met Leu Val Thr Pro Ser Met Ala Met Arg Cys Val Gly Ile Gly Asn
 275 280 285

Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
 290 295 300

Leu Glu His Gly Ser Cys Val Thr Thr Met Ala Lys Asp Lys Pro Thr
 305 310 315 320

Leu Asp Ile Glu Leu Leu Lys Thr Glu Val Thr Asn Pro Ala Val Leu
 325 330 335

Arg Lys Leu Cys Ile Glu Ala Lys Ile Ser Asn Thr Thr Thr Asp Ser
 340 345 350

Arg Cys Pro Thr Gln Gly Glu Ala Thr Leu Val Glu Glu Gln Asp Thr
 355 360 365

Asn Phe Val Cys Arg Arg Thr Phe Val Asp Arg Gly Trp Gly Asn Gly
 370 375 380

Cys Gly Leu Phe Gly Lys Gly Ser Leu Ile Thr Cys Ala Lys Phe Lys
 385 390 395 400

Cys Val Thr Lys Leu Glu Gly Lys Ile Val Gln Tyr Glu Asn Leu Lys
 405 410 415

Tyr Ser Val Ile Val Thr Val His Thr Gly Asp Gln His Gln Val Gly
 420 425 430

Asn Glu Thr Thr Glu His Gly Thr Thr Ala Thr Ile Thr Pro Gln Ala
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435

440

445

Pro Thr Ser Glu Ile Gln Leu Thr Asp Tyr Gly Ala Leu Thr Leu Asp
 450 455 460

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

Met Glu Lys Lys Ser Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu
 485 490 495

Pro Leu Pro Trp Thr Ser Gly Ala Ser Thr Ser Gln Glu Thr Trp Asn
 500 505 510

Arg Gln Asp Leu Leu Val Thr Phe Lys Thr Ala His Ala Lys Lys Gln
 515 520 525

Glu Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
 530 535 540

Thr Gly Ala Thr Glu Ile Gln Thr Ser Gly Thr Thr Thr Ile Phe Ala
 545 550 555 560

Gly His Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Thr Leu Lys Gly
 565 570 575

Met Ser Tyr Val Met Cys Thr Gly Ser Phe Lys Leu Glu Lys Glu Val
 580 585 590

Ala Glu Thr Gln His Gly Thr Val Leu Val Gln Val Lys Tyr Glu Gly
 595 600 605

Thr Asp Ala Pro Cys Lys Ile Pro Phe Ser Ser Gln Asp Glu Lys Gly
 610 615 620

Val Thr Gln Asn Gly Arg Leu Ile Thr Ala Asn Pro Ile Val Thr Asp
 625 630 635 640

Lys Glu Lys Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser
 645 650 655

Tyr Ile Val Val Gly Ala Gly Glu Lys Ala Leu Lys Leu Ser Trp Phe
 660 665 670

Lys Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly
 675 680 685

Ala Arg Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
 690 695 700

Ile Gly Gly Val Phe Thr Ser Val Gly Lys Leu Ile His Gln Ile Phe
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705 710 715 720
 Gly Thr Ala Tyr Gly Val Leu Phe Ser Gly Val Ser Trp Thr Met Lys
 725 730 735
 Ile Gly Ile Gly Ile Leu Leu Thr Trp Leu Gly Leu Asn Ser Arg Ser
 740 745 750
 Thr Ser Leu Ser Met Thr Cys Ile Ala Val Gly Met Val Thr Leu Tyr
 755 760 765
 Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Ile Asn Trp Lys
 770 775 780
 Gly Arg Glu Leu Lys Cys Gly Ser Gly Ile Phe Val Thr Asn Glu Val
 785 790 795 800
 His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Ala Asp Ser Pro Lys Arg
 805 810 815
 Leu Ser Ala Ala Ile Gly Lys Ala Trp Glu Glu Gly Val Cys Gly Ile
 820 825 830
 Arg Ser Ala Thr Arg Leu Glu Asn Ile Met Trp Lys Gln Ile Ser Asn
 835 840 845
 Glu Leu Asn His Ile Leu Leu Glu Asn Asp Met Lys Phe Thr Val Val
 850 855 860
 Val Gly Asp Val Ser Gly Ile Leu Ala Gln Gly Lys Lys Met Ile Arg
 865 870 875 880
 Pro Gln Pro Met Glu His Lys Tyr Ser Trp Lys Ser Trp Gly Lys Ala
 885 890 895
 Lys Ile Ile Gly Ala Asp Val Gln Asn Thr Thr Phe Ile Ile Asp Gly
 900 905 910
 Pro Asn Thr Pro Glu Cys Pro Asp Asn Gln Arg Ala Trp Asn Ile Trp
 915 920 925
 Glu Val Glu Asp Tyr Gly Phe Gly Ile Phe Thr Thr Asn Ile Trp Leu
 930 935 940
 Lys Leu Arg Asp Ser Tyr Thr Gln Val Cys Asp His Arg Leu Met Ser
 945 950 955 960
 Ala Ala Ile Lys Asp Ser Lys Ala Val His Ala Asp Met Gly Tyr Trp
 965 970 975
 Ile Glu Ser Glu Lys Asn Glu Thr Trp Lys Leu Ala Arg Ala Ser Phe
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980

985

990

Ile Glu Val Lys Thr Cys Ile Trp Pro Lys Ser His Thr Leu Trp Ser
 995 1000 1005

Asn Gly Val Leu Glu Ser Glu Met Ile Ile Pro Lys Ile Tyr Gly
 1010 1015 1020

Gly Pro Ile Ser Gln His Asn Tyr Arg Pro Gly Tyr Phe Thr Gln
 1025 1030 1035

Thr Ala Gly Pro Trp His Leu Gly Lys Leu Glu Leu Asp Phe Asp
 1040 1045 1050

Leu Cys Glu Gly Thr Thr Val Val Val Asp Glu His Cys Gly Asn
 1055 1060 1065

Arg Gly Pro Ser Leu Arg Thr Thr Thr Val Thr Gly Lys Thr Ile
 1070 1075 1080

His Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Phe
 1085 1090 1095

Lys Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Val
 1100 1105 1110

Lys Glu Lys Glu Glu Asn Leu Val Lys Ser Met Val Ser Ala Gly
 1115 1120 1125

Ser Gly Glu Val Asp Ser Phe Ser Leu Gly Leu Leu Cys Ile Ser
 1130 1135 1140

Ile Met Ile Glu Glu Val Met Arg Ser Arg Trp Ser Arg Lys Met
 1145 1150 1155

Leu Met Thr Gly Thr Leu Ala Val Phe Leu Leu Leu Thr Met Gly
 1160 1165 1170

Gln Leu Thr Trp Asn Asp Leu Ile Arg Leu Cys Ile Met Val Gly
 1175 1180 1185

Ala Asn Ala Ser Asp Lys Met Gly Met Gly Thr Thr Tyr Leu Ala
 1190 1195 1200

Leu Met Ala Thr Phe Arg Met Arg Pro Met Phe Ala Val Gly Leu
 1205 1210 1215

Leu Phe Arg Arg Leu Thr Ser Arg Glu Val Leu Leu Leu Thr Val
 1220 1225 1230

Gly Leu Ser Leu Val Ala Ser Val Glu Leu Pro Asn Ser Leu Glu
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1235

1240

1245

Glu Leu Gly Asp Gly Leu Ala Met Gly Ile Met Met Leu Lys Leu
1250 1255 1260

Leu Thr Asp Phe Gln Ser His Gln Leu Trp Ala Thr Leu Leu Ser
1265 1270 1275

Leu Thr Phe Val Lys Thr Thr Phe Ser Leu His Tyr Ala Trp Lys
1280 1285 1290

Thr Met Ala Met Ile Leu Ser Ile Val Ser Leu Phe Pro Leu Cys
1295 1300 1305

Leu Ser Thr Thr Ser Gln Lys Thr Thr Trp Leu Pro Val Leu Leu
1310 1315 1320

Gly Ser Leu Gly Cys Lys Pro Leu Thr Met Phe Leu Ile Thr Glu
1325 1330 1335

Asn Lys Ile Trp Gly Arg Lys Ser Trp Pro Leu Asn Glu Gly Ile
1340 1345 1350

Met Ala Val Gly Ile Val Ser Ile Leu Leu Ser Ser Leu Leu Lys
1355 1360 1365

Asn Asp Val Pro Leu Ala Gly Pro Leu Ile Ala Gly Gly Met Leu
1370 1375 1380

Ile Ala Cys Tyr Val Ile Ser Gly Ser Ser Ala Asp Leu Ser Leu
1385 1390 1395

Glu Lys Ala Ala Glu Val Ser Trp Glu Glu Glu Ala Glu His Ser
1400 1405 1410

Gly Ala Ser His Asn Ile Leu Val Glu Val Gln Asp Asp Gly Thr
1415 1420 1425

Met Lys Ile Lys Asp Glu Glu Arg Asp Asp Thr Leu Thr Ile Leu
1430 1435 1440

Leu Lys Ala Thr Leu Leu Ala Ile Ser Gly Val Tyr Pro Met Ser
1445 1450 1455

Ile Pro Ala Thr Leu Phe Val Trp Tyr Phe Trp Gln Lys Lys Lys
1460 1465 1470

Gln Arg Ser Gly Val Leu Trp Asp Thr Pro Ser Pro Pro Glu Val
1475 1480 1485

Glu Arg Ala Val Leu Asp Asp Gly Ile Tyr Arg Ile Leu Gln Arg
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1745

1750

1755

Met Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg
1760 1765 1770

Gly Tyr Ile Ser Thr Arg Val Gly Met Gly Glu Ala Ala Ala Ile
1775 1780 1785

Phe Met Thr Ala Thr Pro Pro Gly Ser Val Glu Ala Phe Pro Gln
1790 1795 1800

Ser Asn Ala Val Ile Gln Asp Glu Glu Arg Asp Ile Pro Glu Arg
1805 1810 1815

Ser Trp Asn Ser Gly Tyr Asp Trp Ile Thr Asp Phe Pro Gly Lys
1820 1825 1830

Thr Val Trp Phe Val Pro Ser Ile Lys Ser Gly Asn Asp Ile Ala
1835 1840 1845

Asn Cys Leu Arg Lys Asn Gly Lys Arg Val Val Gln Leu Ser Arg
1850 1855 1860

Lys Thr Phe Asp Thr Glu Tyr Gln Lys Thr Lys Asn Asn Asp Trp
1865 1870 1875

Asp Tyr Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe
1880 1885 1890

Arg Ala Asp Arg Val Ile Asp Pro Arg Arg Cys Leu Lys Pro Val
1895 1900 1905

Ile Leu Lys Asp Gly Pro Glu Arg Val Ile Leu Ala Gly Pro Met
1910 1915 1920

Pro Val Thr Val Ala Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly
1925 1930 1935

Arg Asn Gln Asn Lys Glu Gly Asp Gln Tyr Ile Tyr Met Gly Gln
1940 1945 1950

Pro Leu Lys Asn Asp Glu Asp His Ala His Trp Thr Glu Ala Lys
1955 1960 1965

Met Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ala
1970 1975 1980

Leu Phe Glu Pro Glu Arg Glu Lys Ser Ala Ala Ile Asp Gly Glu
1985 1990 1995

Tyr Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Glu Leu Met
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2000	2005	2010
Arg Arg Gly Asp Leu Pro Val Trp Leu Ser Tyr Lys Val Ala Ser 2015 2020 2025		
Glu Gly Phe Gln Tyr Ser Asp Arg Arg Trp Cys Phe Asp Gly Glu 2030 2035 2040		
Arg Asn Asn Gln Val Leu Glu Glu Asn Met Asp Val Glu Ile Trp 2045 2050 2055		
Thr Lys Glu Gly Glu Arg Lys Lys Leu Arg Pro Arg Trp Leu Asp 2060 2065 2070		
Ala Arg Thr Tyr Ser Asp Pro Leu Ala Leu Arg Glu Phe Lys Glu 2075 2080 2085		
Phe Ala Ala Gly Arg Arg Ser Val Ser Gly Asp Leu Ile Leu Glu 2090 2095 2100		
Ile Gly Lys Leu Pro Gln His Leu Thr Gln Arg Ala Gln Asn Ala 2105 2110 2115		
Leu Asp Asn Leu Val Met Leu His Asn Ser Glu Gln Gly Gly Lys 2120 2125 2130		
Ala Tyr Arg His Ala Met Glu Glu Leu Pro Asp Thr Ile Glu Thr 2135 2140 2145		
Leu Met Leu Leu Ala Leu Ile Ala Val Leu Thr Gly Gly Val Thr 2150 2155 2160		
Leu Phe Phe Leu Ser Gly Arg Gly Leu Gly Lys Thr Ser Ile Gly 2165 2170 2175		
Leu Leu Cys Val Ile Ala Ser Ser Ala Leu Leu Trp Met Ala Ser 2180 2185 2190		
Val Glu Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe 2195 2200 2205		
Leu Met Val Leu Leu Ile Pro Glu Pro Asp Arg Gln Arg Thr Pro 2210 2215 2220		
Gln Asp Asn Gln Leu Ala Tyr Val Val Ile Gly Leu Leu Phe Met 2225 2230 2235		
Ile Leu Thr Val Ala Ala Asn Glu Met Gly Leu Leu Glu Thr Thr 2240 2245 2250		
Lys Lys Asp Leu Gly Ile Gly His Ala Ala Ala Glu Asn His His		

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2255 2260 2265
 His Ala Ala Met Leu Asp Val Asp Leu His Pro Ala Ser Ala Trp
 2270 2275 2280
 Thr Leu Tyr Ala Val Ala Thr Thr Ile Ile Thr Pro Met Met Arg
 2285 2290 2295
 His Thr Ile Glu Asn Thr Thr Ala Asn Ile Ser Leu Thr Ala Ile
 2300 2305 2310
 Ala Asn Gln Ala Ala Ile Leu Met Gly Leu Asp Lys Gly Trp Pro
 2315 2320 2325
 Ile Ser Lys Met Asp Ile Gly Val Pro Leu Leu Ala Leu Gly Cys
 2330 2335 2340
 Tyr Ser Gln Val Asn Pro Leu Thr Leu Thr Ala Ala Val Phe Met
 2345 2350 2355
 Leu Val Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys
 2360 2365 2370
 Ala Thr Arg Glu Ala Gln Lys Arg Thr Ala Ala Gly Ile Met Lys
 2375 2380 2385
 Asn Pro Thr Val Asp Gly Ile Val Ala Ile Asp Leu Asp Pro Val
 2390 2395 2400
 Val Tyr Asp Ala Lys Phe Glu Lys Gln Leu Gly Gln Ile Met Leu
 2405 2410 2415
 Leu Ile Leu Cys Thr Ser Gln Ile Leu Leu Met Arg Thr Thr Trp
 2420 2425 2430
 Ala Leu Cys Glu Ser Ile Thr Leu Ala Thr Gly Pro Leu Thr Thr
 2435 2440 2445
 Leu Trp Glu Gly Ser Pro Gly Lys Phe Trp Asn Thr Thr Ile Ala
 2450 2455 2460
 Val Ser Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala
 2465 2470 2475
 Gly Leu Ala Phe Ser Leu Met Lys Ser Leu Gly Gly Gly Arg Arg
 2480 2485 2490
 Gly Thr Gly Ala Gln Gly Glu Thr Leu Gly Glu Lys Trp Lys Arg
 2495 2500 2505
 Gln Leu Asn Gln Leu Ser Lys Ser Glu Phe Asn Thr Tyr Lys Arg
 2510 2515 2520

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2510

2515

2520

Ser Gly Ile Ile Glu Val Asp Arg Ser Glu Ala Lys Glu Gly Leu
2525 2530 2535

Lys Arg Gly Glu Thr Thr Lys His Ala Val Ser Arg Gly Thr Ala
2540 2545 2550

Ala Leu Arg Trp Phe Val Glu Arg Asn Leu Val Lys Pro Glu Gly
2555 2560 2565

Lys Val Ile Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr
2570 2575 2580

Cys Ala Gly Leu Lys Lys Val Thr Glu Val Lys Gly Tyr Thr Lys
2585 2590 2595

Gly Gly Pro Gly His Glu Glu Pro Ile Pro Met Ala Thr Tyr Gly
2600 2605 2610

Trp Asn Leu Val Lys Leu Tyr Ser Gly Lys Asp Val Phe Phe Thr
2615 2620 2625

Pro Pro Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser
2630 2635 2640

Ser Pro Asn Pro Thr Ile Glu Glu Gly Arg Thr Leu Arg Val Leu
2645 2650 2655

Lys Met Val Glu Pro Trp Leu Arg Gly Asn Gln Phe Cys Ile Lys
2660 2665 2670

Ile Leu Asn Pro Tyr Met Pro Ser Val Val Glu Thr Leu Glu Gln
2675 2680 2685

Met Gln Arg Lys His Gly Gly Met Leu Val Arg Asn Pro Leu Ser
2690 2695 2700

Arg Asn Ser Thr His Ala Met Tyr Trp Val Ser Cys Gly Thr Gly
2705 2710 2715

Asn Ile Val Ser Ala Val Asn Met Thr Ser Arg Met Leu Leu Asn
2720 2725 2730

Arg Phe Thr Met Ala His Arg Lys Pro Thr Tyr Glu Arg Asp Val
2735 2740 2745

Asp Leu Gly Ala Gly Thr Arg His Val Ala Val Glu Pro Glu Val
2750 2755 2760

Ala Asn Leu Asp Ile Ile Gly Gln Arg Ile Glu Asn Ile Lys Asn
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2765

2770

2775

Glu His Lys Ser Thr Trp His Tyr Asp Glu Asp Asn Pro Tyr Lys
2780 2785 2790

Thr Trp Ala Tyr His Gly Ser Tyr Glu Val Lys Pro Ser Gly Ser
2795 2800 2805

Ala Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro
2810 2815 2820

Trp Asp Val Ile Pro Met Val Thr Gln Ile Ala Met Thr Asp Thr
2825 2830 2835

Thr Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr
2840 2845 2850

Arg Thr Pro Lys Ala Lys Arg Gly Thr Ala Gln Ile Met Glu Val
2855 2860 2865

Thr Ala Arg Trp Leu Trp Gly Phe Leu Ser Arg Asn Lys Lys Pro
2870 2875 2880

Arg Ile Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn
2885 2890 2895

Ala Ala Ile Gly Ala Val Phe Val Asp Glu Asn Gln Trp Asn Ser
2900 2905 2910

Ala Lys Glu Ala Val Glu Asp Glu Arg Phe Trp Asp Leu Val His
2915 2920 2925

Arg Glu Arg Glu Leu His Lys Gln Gly Lys Cys Ala Thr Cys Val
2930 2935 2940

Tyr Asn Met Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly
2945 2950 2955

Lys Ala Lys Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala
2960 2965 2970

Arg Phe Leu Glu Phe Glu Ala Leu Gly Phe Met Asn Glu Asp His
2975 2980 2985

Trp Phe Ser Arg Glu Asn Ser Leu Ser Gly Val Glu Gly Glu Gly
2990 2995 3000

Leu His Lys Leu Gly Tyr Ile Leu Arg Asp Ile Ser Lys Ile Pro
3005 3010 3015

Gly Gly Asn Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg
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3020

3025

3030

Ile Thr Glu Asp Asp Leu Gln Asn Glu Ala Lys Ile Thr Asp Ile
3035 3040 3045

Met Glu Pro Glu His Ala Leu Leu Ala Thr Ser Ile Phe Lys Leu
3050 3055 3060

Thr Tyr Gln Asn Lys Val Val Arg Val Gln Arg Pro Ala Lys Asn
3065 3070 3075

Gly Thr Val Met Asp Val Ile Ser Arg Arg Asp Gln Arg Gly Ser
3080 3085 3090

Gly Gln Val Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu
3095 3100 3105

Ala Gln Leu Ile Arg Gln Met Glu Ser Glu Gly Ile Phe Ser Pro
3110 3115 3120

Ser Glu Leu Glu Thr Pro Asn Leu Ala Glu Arg Val Leu Asp Trp
3125 3130 3135

Leu Lys Lys His Gly Thr Glu Arg Leu Lys Arg Met Ala Ile Ser
3140 3145 3150

Gly Asp Asp Cys Val Val Lys Pro Ile Asp Asp Arg Phe Ala Thr
3155 3160 3165

Ala Leu Thr Ala Leu Asn Asp Met Gly Lys Val Arg Lys Asp Ile
3170 3175 3180

Pro Gln Trp Glu Pro Ser Lys Gly Trp Asn Asp Trp Gln Gln Val
3185 3190 3195

Pro Phe Cys Ser His His Phe His Gln Leu Ile Met Lys Asp Gly
3200 3205 3210

Arg Glu Ile Val Val Pro Cys Arg Asn Gln Asp Glu Leu Val Gly
3215 3220 3225

Arg Ala Arg Val Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr
3230 3235 3240

Ala Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Gln Leu Met Tyr
3245 3250 3255

Phe His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser
3260 3265 3270

Ala Val Pro Val Asp Trp Val Pro Thr Ser Arg Thr Thr Trp Ser
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3275

3280

3285

Ile His Ala His His Gln Trp Met Thr Thr Glu Asp Met Leu Ser
 3290 3295 3300

Val Trp Asn Arg Val Trp Ile Glu Glu Asn Pro Trp Met Glu Asp
 3305 3310 3315

Lys Thr His Val Ser Ser Trp Glu Asp Val Pro Tyr Leu Gly Lys
 3320 3325 3330

Arg Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ala Arg
 3335 3340 3345

Ala Thr Trp Ala Thr Asn Ile Gln Val Ala Ile Asn Gln Val Arg
 3350 3355 3360

Arg Leu Ile Gly Asn Glu Asn Tyr Leu Thr Ser Met Lys Arg Phe
 3365 3370 3375

Lys Asn Glu Ser Asp Pro Glu Gly Ala Leu Trp
 3380 3385

<210> 10
 <211> 3391
 <212> PRT
 <213> Dengue virus type 2

<220>
 <221> MISC_FEATURE
 <222> (2492)..(3391)
 <223> Non-structural protein 5 in DENV-2 MT mutant passage 10

<220>
 <221> MISC_FEATURE
 <222> (2552)..(2552)
 <223> Mutation of Lys to Ala

<220>
 <221> MISC_FEATURE
 <222> (2708)..(2708)
 <223> Mutation from Glu to Ala

<400> 10

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

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

Phe Ser Leu Gly Met Leu Gln Gly Arg Gly Pro Leu Lys Leu Phe Met
 35 40 45

Ala Leu Val Ala Phe Leu Arg Phe Leu Thr Ile Pro Pro Thr Ala Gly
 50 55 60

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

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Arg Lys Tyr Cys Ile Glu Ala Lys Leu Thr Asn Thr Thr Thr Ala Ser
340 345 350

Arg Cys Pro Thr Gln Gly Glu Pro Ser Leu Asn Glu Glu Gln Asp Lys
355 360 365

Arg Phe Val Cys Lys His Ser Met Val Asp Arg Gly Trp Gly Asn Gly
370 375 380

Cys Gly Leu Phe Gly Lys Gly Gly Ile Val Thr Cys Ala Met Phe Thr
385 390 395 400

Cys Lys Lys Asn Met Glu Gly Lys Val Val Gln Pro Glu Asn Leu Glu
405 410 415

Tyr Thr Ile Val Ile Thr Pro His Ser Gly Glu Glu Asn Ala Val Gly
420 425 430

Asn Asp Thr Gly Lys His Gly Lys Glu Ile Lys Val Thr Pro Gln Ser
435 440 445

Ser Ile Thr Glu Ala Glu Leu Thr Gly Tyr Gly Thr Val Thr Met Glu
450 455 460

Cys Ser Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Val Leu Leu Gln
465 470 475 480

Met Glu Asn Lys Ala Trp Leu Val His Arg Gln Trp Phe Leu Asp Leu
485 490 495

Pro Leu Pro Trp Leu Pro Gly Ala Asp Thr Gln Gly Ser Asn Trp Ile
500 505 510

Gln Lys Glu Thr Leu Val Thr Phe Lys Asn Pro His Ala Lys Lys Gln
515 520 525

Asp Val Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu
530 535 540

Thr Gly Ala Thr Glu Ile Gln Met Ser Ser Gly Asn Leu Leu Phe Thr
545 550 555 560

Gly His Leu Lys Cys Arg Leu Arg Met Asp Lys Leu Gln Leu Lys Gly
565 570 575

Met Ser Tyr Ser Met Cys Thr Gly Lys Phe Lys Val Val Lys Glu Ile
580 585 590

Ala Glu Thr Gln His Gly Thr Ile Val Ile Arg Val Gln Tyr Glu Gly
595 600 605

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Asp Gly Ser Pro Cys Lys Ile Pro Phe Glu Ile Met Asp Leu Glu Lys
 610 615 620
 Arg His Val Leu Gly Arg Leu Ile Thr Val Asn Pro Ile Val Thr Glu
 625 630 635 640
 Lys Asp Ser Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Asp Ser
 645 650 655
 Tyr Ile Ile Ile Gly Val Glu Pro Gly Gln Leu Lys Leu Ser Trp Phe
 660 665 670
 Lys Lys Gly Ser Ser Ile Gly Gln Met Phe Glu Thr Thr Met Arg Gly
 675 680 685
 Ala Lys Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser
 690 695 700
 Leu Gly Gly Val Phe Thr Ser Ile Gly Lys Ala Leu His Gln Val Phe
 705 710 715 720
 Gly Ala Ile Tyr Gly Ala Ala Phe Ser Gly Val Ser Trp Thr Met Lys
 725 730 735
 Ile Leu Ile Gly Val Val Ile Thr Trp Ile Gly Met Asn Ser Arg Ser
 740 745 750
 Thr Ser Leu Ser Val Ser Leu Val Leu Val Gly Val Val Thr Leu Tyr
 755 760 765
 Leu Gly Val Met Val Gln Ala Asp Ser Gly Cys Val Val Ser Trp Lys
 770 775 780
 Asn Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Ile Thr Asp Asn Val
 785 790 795 800
 His Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ser Lys
 805 810 815
 Leu Ala Ser Ala Ile Gln Lys Ala His Glu Glu Gly Ile Cys Gly Ile
 820 825 830
 Arg Ser Val Thr Arg Leu Glu Asn Leu Met Trp Lys Gln Ile Thr Pro
 835 840 845
 Glu Leu Asn His Ile Leu Ser Glu Asn Glu Val Lys Leu Thr Ile Met
 850 855 860
 Thr Gly Asp Ile Lys Gly Ile Met Gln Ala Gly Lys Arg Ser Leu Arg
 865 870 875 880

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Pro Gln Pro Thr Glu Leu Lys Tyr Ser Trp Lys Ala Trp Gly Lys Ala
 885 890 895
 Lys Met Leu Ser Thr Glu Leu His Asn His Thr Phe Leu Ile Asp Gly
 900 905 910
 Pro Glu Thr Ala Glu Cys Pro Asn Thr Asn Arg Ala Trp Asn Ser Leu
 915 920 925
 Glu Val Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu
 930 935 940
 Lys Leu Lys Glu Arg Gln Asp Val Phe Cys Asp Ser Lys Leu Met Ser
 945 950 955 960
 Ala Ala Ile Lys Asp Asn Arg Ala Val His Ala Asp Met Gly Tyr Trp
 965 970 975
 Ile Glu Ser Ala Leu Asn Asp Thr Trp Lys Ile Glu Lys Ala Ser Phe
 980 985 990
 Ile Glu Val Lys Ser Cys His Trp Pro Lys Ser His Thr Leu Trp Ser
 995 1000 1005
 Asn Gly Val Leu Glu Ser Glu Met Ile Ile Pro Lys Asn Phe Ala
 1010 1015 1020
 Gly Pro Val Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln
 1025 1030 1035
 Thr Ala Gly Pro Trp His Leu Gly Arg Leu Glu Met Asp Phe Asp
 1040 1045 1050
 Phe Cys Glu Gly Thr Thr Val Val Val Thr Glu Asp Cys Gly Asn
 1055 1060 1065
 Arg Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Ile
 1070 1075 1080
 Thr Glu Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr
 1085 1090 1095
 Arg Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu
 1100 1105 1110
 Lys Glu Lys Glu Glu Asn Leu Val Asn Ser Leu Val Thr Ala Gly
 1115 1120 1125
 His Gly Gln Ile Asp Asn Phe Ser Leu Gly Val Leu Gly Met Ala
 1130 1135 1140

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Leu Phe Leu Glu Glu Met Leu Arg Thr Arg Val Gly Thr Lys His
 1145 1150 1155
 Ala Ile Leu Leu Val Ala Val Ser Phe Val Thr Leu Ile Thr Gly
 1160 1165 1170
 Asn Met Ser Phe Arg Asp Leu Gly Arg Val Met Val Met Val Gly
 1175 1180 1185
 Ala Thr Met Thr Asp Asp Ile Gly Met Gly Val Thr Tyr Leu Ala
 1190 1195 1200
 Leu Leu Ala Ala Phe Lys Val Arg Pro Thr Phe Ala Ala Gly Leu
 1205 1210 1215
 Leu Leu Arg Lys Leu Thr Ser Lys Glu Leu Met Met Thr Thr Ile
 1220 1225 1230
 Gly Ile Val Leu Leu Ser Gln Ser Thr Ile Pro Glu Thr Ile Leu
 1235 1240 1245
 Glu Leu Thr Asp Ala Leu Ala Leu Gly Met Met Val Leu Lys Ile
 1250 1255 1260
 Val Arg Asn Met Glu Lys Tyr Gln Leu Ala Val Thr Ile Met Ala
 1265 1270 1275
 Ile Leu Cys Val Pro Asn Ala Val Ile Leu Gln Asn Ala Trp Lys
 1280 1285 1290
 Val Ser Cys Thr Thr Leu Ala Val Val Ser Val Ser Pro Leu Leu
 1295 1300 1305
 Leu Thr Ser Ser Gln Gln Lys Ala Asp Trp Ile Pro Leu Ala Leu
 1310 1315 1320
 Thr Ile Lys Gly Leu Asn Pro Thr Ala Ile Phe Leu Thr Thr Leu
 1325 1330 1335
 Ser Arg Thr Ser Lys Lys Arg Ser Trp Pro Leu Asn Glu Ala Ile
 1340 1345 1350
 Met Ala Val Gly Met Val Ser Ile Leu Ala Ser Ser Leu Leu Lys
 1355 1360 1365
 Asn Asp Ile Pro Met Thr Gly Pro Leu Val Ala Gly Gly Leu Leu
 1370 1375 1380
 Thr Val Cys Tyr Val Leu Thr Gly Arg Ser Ala Asp Leu Glu Leu
 1385 1390 1395

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Glu Arg Ala Ala Asp Val Arg Trp Glu Glu Gln Ala Glu Ile Ser
 1400 1405 1410
 Gly Ser Ser Pro Ile Leu Ser Ile Thr Ile Ser Glu Asp Gly Ser
 1415 1420 1425
 Met Ser Ile Lys Asn Glu Glu Glu Glu Gln Thr Leu Thr Ile Leu
 1430 1435 1440
 Ile Arg Thr Gly Leu Leu Val Ile Ser Gly Leu Phe Pro Ala Ser
 1445 1450 1455
 Ile Pro Ile Thr Ala Ala Ala Trp Tyr Leu Trp Glu Val Lys Lys
 1460 1465 1470
 Gln Arg Ala Gly Val Leu Trp Asp Val Pro Ser Pro Pro Pro Val
 1475 1480 1485
 Gly Lys Ala Glu Leu Glu Asp Gly Ala Tyr Arg Ile Lys Gln Lys
 1490 1495 1500
 Gly Ile Leu Gly Tyr Ser Gln Ile Gly Ala Gly Val Tyr Lys Glu
 1505 1510 1515
 Gly Thr Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu
 1520 1525 1530
 Met His Lys Gly Lys Arg Ile Glu Pro Ser Trp Ala Asp Val Lys
 1535 1540 1545
 Lys Asp Leu Ile Ser Tyr Gly Gly Gly Trp Lys Leu Glu Gly Glu
 1550 1555 1560
 Trp Lys Glu Gly Glu Glu Val Gln Val Leu Ala Leu Glu Pro Gly
 1565 1570 1575
 Lys Asn Pro Arg Ala Val Gln Thr Lys Pro Gly Leu Phe Lys Thr
 1580 1585 1590
 Asn Thr Gly Thr Ile Gly Ala Val Ser Leu Asp Phe Ser Pro Gly
 1595 1600 1605
 Thr Ser Gly Ser Pro Ile Val Asp Lys Lys Gly Lys Val Val Gly
 1610 1615 1620
 Leu Tyr Gly Asn Gly Val Val Thr Arg Ser Gly Ala Tyr Val Ser
 1625 1630 1635
 Ala Ile Ala Gln Thr Glu Lys Ser Ile Glu Asp Asn Pro Glu Ile
 1640 1645 1650

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Glu Asp Asp Ile Phe Arg Lys Lys Arg Leu Thr Ile Met Asp Leu
 1655 1660 1665
 His Pro Gly Ala Gly Lys Thr Lys Arg Tyr Leu Pro Ala Ile Val
 1670 1675 1680
 Arg Glu Ala Ile Lys Arg Gly Leu Arg Thr Leu Ile Leu Ala Pro
 1685 1690 1695
 Thr Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu
 1700 1705 1710
 Pro Ile Arg Tyr Gln Thr Pro Ala Ile Arg Ala Glu His Thr Gly
 1715 1720 1725
 Arg Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg
 1730 1735 1740
 Leu Leu Ser Pro Ile Arg Val Pro Asn Tyr Asn Leu Ile Ile Met
 1745 1750 1755
 Asp Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly
 1760 1765 1770
 Tyr Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Gly Ile Phe
 1775 1780 1785
 Met Thr Ala Thr Pro Pro Gly Ser Arg Asp Pro Phe Pro Gln Ser
 1790 1795 1800
 Asn Ala Pro Ile Met Asp Glu Glu Arg Glu Ile Pro Glu Arg Ser
 1805 1810 1815
 Trp Asn Ser Gly His Glu Trp Val Thr Asp Phe Lys Gly Lys Thr
 1820 1825 1830
 Val Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Ala
 1835 1840 1845
 Cys Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys
 1850 1855 1860
 Thr Phe Asp Ser Glu Tyr Ile Lys Thr Arg Thr Asn Asp Trp Asp
 1865 1870 1875
 Phe Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys
 1880 1885 1890
 Ala Glu Arg Val Ile Asp Pro Arg Arg Cys Met Lys Pro Val Ile
 1895 1900 1905

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Leu Thr Asp Gly Glu Glu Arg Val Ile Leu Ala Gly Pro Met Pro
 1910 1915 1920
 Val Thr His Ser Ser Ala Ala Gln Arg Arg Gly Arg Val Gly Arg
 1925 1930 1935
 Asn Pro Lys Asn Glu Asn Asp Gln Tyr Ile Tyr Met Gly Glu Pro
 1940 1945 1950
 Leu Glu Asn Asp Glu Asp Cys Ala His Trp Lys Glu Ala Lys Met
 1955 1960 1965
 Leu Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ser Met
 1970 1975 1980
 Phe Glu Pro Glu Arg Glu Lys Val Asp Ala Ile Asp Gly Glu Tyr
 1985 1990 1995
 Arg Leu Arg Gly Glu Ala Arg Lys Thr Phe Val Asp Leu Met Arg
 2000 2005 2010
 Arg Gly Asp Leu Pro Val Trp Leu Ala Tyr Arg Val Ala Ala Glu
 2015 2020 2025
 Gly Ile Asn Tyr Ala Asp Arg Arg Trp Cys Phe Asp Gly Val Lys
 2030 2035 2040
 Asn Asn Gln Ile Leu Glu Glu Asn Val Glu Val Glu Ile Trp Thr
 2045 2050 2055
 Lys Glu Gly Glu Arg Lys Lys Leu Lys Pro Arg Trp Leu Asp Ala
 2060 2065 2070
 Arg Ile Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Glu Phe
 2075 2080 2085
 Ala Ala Gly Arg Lys Ser Leu Thr Leu Asn Leu Ile Thr Glu Met
 2090 2095 2100
 Gly Arg Leu Pro Thr Phe Met Thr Gln Lys Ala Arg Asn Ala Leu
 2105 2110 2115
 Asp Asn Leu Ala Val Leu His Thr Ala Glu Ala Gly Gly Arg Ala
 2120 2125 2130
 Tyr Asn His Ala Leu Ser Glu Leu Pro Glu Thr Leu Glu Thr Leu
 2135 2140 2145
 Leu Leu Leu Thr Leu Leu Ala Thr Val Thr Gly Gly Ile Phe Leu
 2150 2155 2160

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Phe Leu Met Ser Gly Lys Gly Ile Gly Lys Met Thr Leu Gly Met
 2165 2170 2175
 Cys Cys Ile Ile Thr Ala Ser Ile Leu Leu Trp Tyr Ala Gln Ile
 2180 2185 2190
 Gln Pro His Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu
 2195 2200 2205
 Ile Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln
 2210 2215 2220
 Asp Asn Gln Leu Thr Tyr Val Val Ile Ala Ile Leu Thr Val Val
 2225 2230 2235
 Ala Ala Thr Met Ala Asn Glu Met Gly Phe Leu Glu Lys Thr Lys
 2240 2245 2250
 Lys Asp Phe Gly Leu Gly Ser Ile Ala Thr Gln Gln Pro Glu Ser
 2255 2260 2265
 Asn Ile Leu Asp Ile Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu
 2270 2275 2280
 Tyr Ala Val Ala Thr Thr Phe Ile Thr Pro Met Leu Arg His Ser
 2285 2290 2295
 Ile Glu Asn Ser Ser Val Asn Val Ser Leu Thr Ala Ile Ala Asn
 2300 2305 2310
 Gln Ala Thr Val Leu Met Gly Leu Gly Lys Gly Trp Pro Leu Ser
 2315 2320 2325
 Lys Met Asp Ile Gly Val Pro Leu Leu Ala Ile Gly Cys Tyr Ser
 2330 2335 2340
 Gln Val Asn Pro Ile Thr Leu Thr Ala Ala Leu Leu Leu Leu Val
 2345 2350 2355
 Ala His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr
 2360 2365 2370
 Arg Glu Ala Gln Lys Arg Ala Ala Ala Gly Ile Met Lys Asn Pro
 2375 2380 2385
 Thr Val Asp Gly Ile Thr Val Ile Asp Leu Asp Pro Ile Pro Tyr
 2390 2395 2400
 Asp Pro Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val
 2405 2410 2415

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Leu Cys Val Thr Gln Val Leu Met Met Arg Thr Thr Trp Ala Leu
 2420 2425 2430
 Cys Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Ser Thr Leu Trp
 2435 2440 2445
 Glu Gly Asn Pro Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser
 2450 2455 2460
 Met Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu
 2465 2470 2475
 Leu Phe Ser Ile Met Lys Asn Thr Ala Asn Thr Arg Arg Gly Thr
 2480 2485 2490
 Gly Asn Thr Gly Glu Thr Leu Gly Glu Lys Trp Lys Asn Arg Leu
 2495 2500 2505
 Asn Ala Leu Gly Lys Ser Glu Phe Gln Ile Tyr Lys Lys Ser Gly
 2510 2515 2520
 Ile Gln Glu Val Asp Arg Thr Leu Ala Lys Glu Gly Ile Lys Arg
 2525 2530 2535
 Gly Glu Thr Asp His His Ala Val Ser Arg Gly Ser Ala Ala Leu
 2540 2545 2550
 Arg Trp Phe Val Glu Arg Asn Leu Val Thr Pro Glu Gly Lys Val
 2555 2560 2565
 Val Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Gly
 2570 2575 2580
 Gly Leu Lys Asn Val Lys Glu Val Lys Gly Leu Thr Lys Gly Gly
 2585 2590 2595
 Pro Gly His Glu Glu Pro Ile Pro Met Ser Thr Tyr Gly Trp Asn
 2600 2605 2610
 Leu Val Arg Leu Gln Ser Gly Val Asp Val Phe Phe Thr Pro Pro
 2615 2620 2625
 Glu Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro
 2630 2635 2640
 Asn Pro Thr Val Glu Ala Gly Arg Thr Leu Arg Val Leu Asn Leu
 2645 2650 2655
 Val Glu Asn Trp Leu Asn Asn Asn Thr Gln Phe Cys Ile Lys Val
 2660 2665 2670

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Leu Asn Pro Tyr Met Pro Ser Val Ile Glu Lys Met Glu Ala Leu
 2675 2680 2685
 Gln Arg Lys Tyr Gly Gly Ala Leu Val Arg Asn Pro Leu Ser Arg
 2690 2695 2700
 Asn Ser Thr His Ala Met Tyr Trp Val Ser Asn Ala Ser Gly Asn
 2705 2710 2715
 Ile Val Ser Ser Val Asn Met Ile Ser Arg Met Leu Ile Asn Arg
 2720 2725 2730
 Phe Thr Met Arg His Lys Lys Ala Thr Tyr Glu Pro Asp Val Asp
 2735 2740 2745
 Leu Gly Ser Gly Thr Arg Asn Ile Gly Ile Glu Ser Glu Thr Pro
 2750 2755 2760
 Asn Leu Asp Ile Ile Gly Lys Arg Ile Glu Lys Ile Lys Gln Glu
 2765 2770 2775
 His Glu Thr Ser Trp His Tyr Asp Gln Asp His Pro Tyr Lys Thr
 2780 2785 2790
 Trp Ala Tyr His Gly Ser Tyr Glu Thr Lys Gln Thr Gly Ser Ala
 2795 2800 2805
 Ser Ser Met Val Asn Gly Val Val Arg Leu Leu Thr Lys Pro Trp
 2810 2815 2820
 Asp Ile Ile Pro Met Val Thr Gln Met Ala Met Thr Asp Thr Thr
 2825 2830 2835
 Pro Phe Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg
 2840 2845 2850
 Thr Gln Glu Pro Lys Glu Gly Thr Lys Lys Leu Met Lys Ile Thr
 2855 2860 2865
 Ala Glu Trp Leu Trp Lys Glu Leu Gly Lys Lys Lys Thr Pro Arg
 2870 2875 2880
 Met Cys Thr Arg Glu Glu Phe Thr Arg Lys Val Arg Ser Asn Ala
 2885 2890 2895
 Ala Leu Gly Ala Ile Phe Thr Asp Glu Asn Lys Trp Lys Ser Ala
 2900 2905 2910
 Arg Glu Ala Val Glu Asp Ser Gly Phe Trp Glu Leu Val Asp Lys
 2915 2920 2925

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Glu	Arg	Asn	Leu	His	Leu	Glu	Gly	Lys	Cys	Glu	Thr	Cys	Val	Tyr
2930						2935					2940			
Asn	Met	Met	Gly	Lys	Arg	Glu	Lys	Lys	Leu	Gly	Glu	Phe	Gly	Lys
2945						2950					2955			
Ala	Lys	Gly	Ser	Arg	Ala	Ile	Trp	Tyr	Met	Trp	Leu	Gly	Ala	Arg
2960						2965					2970			
Phe	Leu	Glu	Phe	Glu	Ala	Leu	Gly	Phe	Leu	Asn	Glu	Asp	His	Trp
2975						2980					2985			
Phe	Ser	Arg	Glu	Asn	Ser	Leu	Ser	Gly	Val	Glu	Gly	Glu	Gly	Leu
2990						2995					3000			
His	Lys	Leu	Gly	Tyr	Ile	Leu	Arg	Asp	Val	Ser	Lys	Lys	Glu	Gly
3005						3010					3015			
Gly	Ala	Met	Tyr	Ala	Asp	Asp	Thr	Ala	Gly	Trp	Asp	Thr	Arg	Ile
3020						3025					3030			
Thr	Leu	Glu	Asp	Leu	Lys	Asn	Glu	Glu	Met	Val	Thr	Asn	His	Met
3035						3040					3045			
Glu	Gly	Glu	His	Lys	Lys	Leu	Ala	Glu	Ala	Ile	Phe	Lys	Leu	Thr
3050						3055					3060			
Tyr	Gln	Asn	Lys	Val	Val	Arg	Val	Gln	Arg	Pro	Thr	Pro	Arg	Gly
3065						3070					3075			
Thr	Val	Met	Asp	Ile	Ile	Ser	Arg	Arg	Asp	Gln	Arg	Gly	Ser	Gly
3080						3085					3090			
Gln	Val	Val	Thr	Tyr	Gly	Leu	Asn	Thr	Phe	Thr	Asn	Met	Glu	Ala
3095						3100					3105			
Gln	Leu	Ile	Arg	Gln	Met	Glu	Gly	Glu	Gly	Val	Phe	Lys	Ser	Ile
3110						3115					3120			
Gln	His	Leu	Thr	Val	Thr	Glu	Glu	Ile	Ala	Val	Lys	Asn	Trp	Leu
3125						3130					3135			
Val	Arg	Val	Gly	Arg	Glu	Arg	Leu	Ser	Arg	Met	Ala	Ile	Ser	Gly
3140						3145					3150			
Asp	Asp	Cys	Val	Val	Lys	Pro	Leu	Asp	Asp	Arg	Phe	Ala	Ser	Ala
3155						3160					3165			
Leu	Thr	Ala	Leu	Asn	Asp	Met	Gly	Lys	Val	Arg	Lys	Asp	Ile	Gln
3170						3175					3180			

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Gln Trp Glu Pro Ser Arg Gly Trp Asn Asp Trp Thr Gln Val Pro
 3185 3190 3195
 Phe Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg
 3200 3205 3210
 Val Leu Val Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg
 3215 3220 3225
 Ala Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala
 3230 3235 3240
 Cys Leu Gly Lys Ser Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe
 3245 3250 3255
 His Arg Arg Asp Leu Arg Leu Ala Ala Asn Ala Ile Cys Ser Ala
 3260 3265 3270
 Val Pro Ser His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile
 3275 3280 3285
 His Ala Thr His Glu Trp Met Thr Thr Glu Asp Met Leu Thr Val
 3290 3295 3300
 Trp Asn Arg Val Trp Ile Gln Glu Asn Pro Trp Met Glu Asp Lys
 3305 3310 3315
 Thr Pro Val Glu Ser Trp Glu Glu Ile Pro Tyr Leu Gly Lys Arg
 3320 3325 3330
 Glu Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala
 3335 3340 3345
 Thr Trp Ala Lys Asn Ile Gln Thr Ala Ile Asn Gln Val Arg Ser
 3350 3355 3360
 Leu Ile Gly Asn Glu Glu Tyr Thr Asp Tyr Met Pro Ser Met Lys
 3365 3370 3375
 Arg Phe Arg Arg Glu Glu Glu Glu Ala Gly Val Leu Trp
 3380 3385 3390

<210> 11
 <211> 3390
 <212> PRT
 <213> Dengue virus type 3

<220>
 <221> MISC_FEATURE
 <222> (2491)..(3390)
 <223> Non-structural protein 5 in DENV-3 MT mutant passage 5
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9869SG2164 Sequence listings_ST25.txt

<220>

<221> MISC_FEATURE

<222> (2551)..(2551)

<223> Mutation from Glu to Ala

<220>

<221> MISC_FEATURE

<222> (2706)..(2706)

<223> Mutation from Lys to Ala

<400> 11

Met Asn Asn Gln Arg Lys Lys Thr Gly Lys Pro Ser Ile Asn Met Leu
 1 5 10 15

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

Phe Ser Arg Gly Leu Leu Asn Gly Gln Gly Pro Met Lys Leu Val Met
 35 40 45

Ala Phe Ile Ala Phe Leu Arg Phe Leu Ala Ile Pro Pro Thr Ala Gly
 50 55 60

Ile Leu Ala Arg Trp Gly Thr Phe Lys Lys Ser Gly Ala Ile Lys Val
 65 70 75 80

Leu Arg Gly Phe Lys Lys Glu Ile Ser Asn Met Leu Ser Ile Ile Asn
 85 90 95

Arg Arg Lys Lys Thr Ser Leu Cys Leu Met Met Met Leu Pro Ala Thr
 100 105 110

Leu Ala Phe His Leu Thr Ser Arg Asp Gly Glu Pro Arg Met Ile Val
 115 120 125

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

Ile Asn Met Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Asp
 145 150 155 160

Asp Thr Val Thr Tyr Lys Cys Pro Leu Ile Thr Glu Val Glu Pro Glu
 165 170 175

Asp Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Thr Tyr Gly
 180 185 190

Thr Cys Asn Gln Ala Gly Glu His Arg Arg Asp Lys Arg Ser Val Ala
 195 200 205

Leu Ala Pro His Val Gly Met Gly Leu Asp Thr Arg Ala Gln Thr Trp
 210 215 220

9869SG2164 Sequence listings_ST25.txt

Met Ser Ala Glu Gly Ala Trp Arg Gln Val Glu Lys Val Glu Thr Trp
 225 230 235 240
 Ala Phe Arg His Pro Gly Phe Thr Ile Leu Ala Leu Phe Leu Ala His
 245 250 255
 Tyr Ile Gly Thr Ser Leu Thr Gln Lys Val Val Ile Phe Ile Leu Leu
 260 265 270
 Met Leu Val Thr Pro Ser Met Thr Met Arg Cys Val Gly Val Gly Asn
 275 280 285
 Arg Asp Phe Val Glu Gly Leu Ser Gly Ala Thr Trp Val Asp Val Val
 290 295 300
 Leu Glu His Gly Gly Cys Val Thr Thr Met Ala Lys Asn Lys Pro Thr
 305 310 315 320
 Leu Asp Ile Glu Leu Gln Lys Thr Glu Ala Thr Gln Leu Ala Thr Leu
 325 330 335
 Arg Lys Leu Cys Ile Glu Gly Lys Ile Thr Asn Val Thr Thr Asp Ser
 340 345 350
 Arg Cys Pro Thr Gln Gly Glu Ala Ile Leu Pro Glu Glu Gln Asp Gln
 355 360 365
 Asn Tyr Val Cys Lys His Thr Tyr Val Asp Arg Gly Trp Gly Asn Gly
 370 375 380
 Cys Gly Leu Phe Gly Lys Gly Ser Leu Val Thr Cys Ala Lys Phe Gln
 385 390 395 400
 Cys Leu Glu Leu Ile Glu Gly Lys Val Val Gln His Glu Asn Leu Lys
 405 410 415
 Tyr Thr Val Ile Ile Thr Val His Thr Gly Asp Gln His Gln Val Gly
 420 425 430
 Asn Glu Thr Gln Gly Val Thr Ala Glu Ile Thr Pro Gln Ala Ser Thr
 435 440 445
 Val Glu Ala Ile Leu Pro Glu Tyr Gly Thr Leu Gly Leu Glu Cys Ser
 450 455 460
 Pro Arg Thr Gly Leu Asp Phe Asn Glu Met Ile Leu Leu Thr Met Lys
 465 470 475 480
 Asn Lys Ala Trp Met Val His Arg Gln Trp Phe Phe Asp Leu Pro Leu
 485 490 495

9869SG2164 Sequence listings_ST25.txt

Pro Trp Thr Ser Gly Ala Thr Thr Glu Thr Pro Thr Trp Asn Lys Lys
 500 505 510

Glu Leu Leu Val Thr Phe Lys Asn Ala His Ala Lys Lys Gln Glu Val
 515 520 525

Val Val Leu Gly Ser Gln Glu Gly Ala Met His Thr Ala Leu Thr Gly
 530 535 540

Ala Thr Glu Ile Gln Thr Ser Gly Gly Thr Ser Ile Phe Ala Gly His
 545 550 555 560

Leu Lys Cys Arg Leu Lys Met Asp Lys Leu Glu Leu Lys Gly Met Ser
 565 570 575

Tyr Ala Met Cys Ser Asn Ala Phe Val Leu Lys Lys Glu Val Ser Glu
 580 585 590

Thr Gln His Gly Thr Ile Leu Ile Lys Val Glu Tyr Lys Gly Glu Asp
 595 600 605

Ala Pro Cys Lys Ile Pro Phe Ser Thr Glu Asp Gly Gln Gly Lys Ala
 610 615 620

His Asn Gly Arg Leu Ile Thr Ala Asn Pro Val Val Thr Lys Lys Glu
 625 630 635 640

Glu Pro Val Asn Ile Glu Ala Glu Pro Pro Phe Gly Glu Ser Asn Ile
 645 650 655

Ile Ile Gly Thr Gly Asp Lys Ala Leu Lys Ile Asn Trp Tyr Lys Lys
 660 665 670

Gly Ser Ser Ile Gly Lys Met Phe Glu Ala Thr Ala Arg Gly Ala Arg
 675 680 685

Arg Met Ala Ile Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
 690 695 700

Gly Val Leu Asn Ser Leu Gly Lys Met Val His Gln Ile Phe Gly Ser
 705 710 715 720

Ala Tyr Thr Ala Leu Phe Ser Gly Val Ser Trp Ile Met Lys Ile Gly
 725 730 735

Ile Gly Val Leu Leu Thr Trp Ile Gly Leu Asn Ser Lys Asn Thr Ser
 740 745 750

Met Ser Phe Ser Cys Ile Val Ile Gly Ile Ile Thr Leu Tyr Leu Gly
 755 760 765

9869SG2164 Sequence listings_ST25.txt

Ala Val Val Gln Ala Asp Met Gly Cys Val Ile Asn Trp Lys Gly Lys
770 775 780

Glu Leu Lys Cys Gly Ser Gly Ile Phe Val Thr Asn Glu Val His Thr
785 790 795 800

Trp Thr Glu Gln Tyr Lys Phe Gln Ala Asp Ser Pro Lys Arg Leu Ala
805 810 815

Thr Ala Ile Ala Gly Ala Trp Glu Asn Gly Val Cys Gly Ile Arg Ser
820 825 830

Thr Thr Arg Met Glu Asn Leu Leu Trp Lys Gln Ile Ala Asn Glu Leu
835 840 845

Asn Tyr Ile Leu Trp Glu Asn Asn Ile Lys Leu Thr Val Val Val Gly
850 855 860

Asp Ile Ile Gly Ile Leu Glu Gln Gly Lys Arg Thr Leu Thr Pro Gln
865 870 875 880

Pro Met Glu Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys Ile
885 890 895

Val Thr Ala Glu Ile Gln Asn Ser Ser Phe Ile Ile Asp Gly Pro Asn
900 905 910

Thr Pro Glu Cys Pro Asn Ala Ser Arg Ala Trp Asn Val Trp Glu Val
915 920 925

Glu Asp Tyr Gly Phe Gly Val Phe Thr Thr Asn Ile Trp Leu Lys Leu
930 935 940

Arg Glu Met Tyr Thr Gln Leu Cys Asp His Arg Leu Met Ser Ala Ala
945 950 955 960

Val Lys Asp Glu Arg Ala Val His Ala Asp Met Gly Tyr Trp Ile Glu
965 970 975

Ser Gln Lys Asn Gly Ser Trp Lys Leu Glu Lys Ala Ser Leu Ile Glu
980 985 990

Val Lys Thr Cys Thr Trp Pro Lys Ser His Thr Leu Trp Ser Asn Gly
995 1000 1005

Val Leu Glu Ser Asp Met Ile Ile Pro Lys Ser Leu Ala Gly Pro
1010 1015 1020

Ile Ser Gln His Asn Tyr Arg Pro Gly Tyr His Thr Gln Thr Ala
1025 1030 1035

9869SG2164 Sequence listings_ST25.txt

Gly Pro Trp His Leu Gly Lys Leu Glu Leu Asp Phe Asn Tyr Cys
 1040 1045 1050
 Glu Gly Thr Thr Val Val Ile Thr Glu Asn Cys Gly Thr Arg Gly
 1055 1060 1065
 Pro Ser Leu Arg Thr Thr Thr Val Ser Gly Lys Leu Ile His Glu
 1070 1075 1080
 Trp Cys Cys Arg Ser Cys Thr Leu Pro Pro Leu Arg Tyr Met Gly
 1085 1090 1095
 Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Ile Asn Glu
 1100 1105 1110
 Lys Glu Glu Asn Met Val Lys Ser Leu Val Ser Ala Gly Ser Gly
 1115 1120 1125
 Lys Val Asp Asn Phe Thr Met Gly Val Leu Cys Leu Ala Ile Leu
 1130 1135 1140
 Phe Glu Glu Val Met Arg Gly Lys Phe Gly Lys Lys His Met Ile
 1145 1150 1155
 Ala Gly Val Leu Phe Thr Phe Val Leu Leu Leu Ser Gly Gln Ile
 1160 1165 1170
 Thr Trp Arg Asp Met Ala Arg Thr Leu Ile Met Ile Gly Ser Asn
 1175 1180 1185
 Ala Ser Asp Arg Met Gly Met Gly Val Thr Tyr Leu Ala Leu Ile
 1190 1195 1200
 Ala Thr Phe Lys Ile Gln Pro Phe Leu Ala Leu Gly Phe Phe Leu
 1205 1210 1215
 Arg Lys Leu Thr Ser Arg Glu Asn Leu Leu Leu Gly Val Gly Leu
 1220 1225 1230
 Ala Met Ala Thr Thr Leu Gln Leu Pro Glu Asp Ile Glu Gln Met
 1235 1240 1245
 Ala Asn Gly Ile Ala Leu Gly Leu Met Ala Leu Lys Leu Ile Thr
 1250 1255 1260
 Gln Phe Glu Thr Tyr Gln Leu Trp Thr Ala Leu Val Ser Leu Met
 1265 1270 1275
 Cys Ser Asn Thr Ile Phe Thr Leu Thr Val Ala Trp Arg Thr Ala
 1280 1285 1290

9869SG2164 sequence listings_ST25.txt

Thr Leu Ile Leu Ala Gly Ile Ser Leu Leu Pro Val Cys Gln Ser
 1295 1300 1305
 Ser Ser Met Arg Lys Thr Asp Trp Leu Pro Met Thr Val Ala Ala
 1310 1315 1320
 Met Gly Val Pro Pro Leu Pro Leu Phe Ile Phe Ser Leu Lys Asp
 1325 1330 1335
 Thr Leu Lys Arg Arg Ser Trp Pro Leu Asn Glu Gly Val Met Ala
 1340 1345 1350
 Val Gly Leu Val Ser Ile Leu Ala Ser Ser Leu Leu Arg Asn Asp
 1355 1360 1365
 Val Pro Met Ala Gly Pro Leu Val Ala Gly Gly Leu Leu Ile Ala
 1370 1375 1380
 Cys Tyr Val Ile Thr Gly Thr Ser Ala Asp Leu Thr Val Glu Lys
 1385 1390 1395
 Ala Ala Asp Val Thr Trp Glu Glu Glu Ala Glu Gln Thr Gly Val
 1400 1405 1410
 Ser His Asn Leu Met Ile Thr Val Asp Asp Asp Gly Thr Met Arg
 1415 1420 1425
 Ile Lys Asp Asp Glu Thr Glu Asn Ile Leu Thr Val Leu Leu Lys
 1430 1435 1440
 Thr Ala Leu Leu Ile Val Ser Gly Ile Phe Pro Tyr Ser Ile Pro
 1445 1450 1455
 Ala Thr Leu Leu Val Trp His Thr Trp Gln Lys Gln Thr Gln Arg
 1460 1465 1470
 Ser Gly Val Leu Trp Asp Val Pro Ser Pro Pro Glu Thr Gln Lys
 1475 1480 1485
 Ala Glu Leu Glu Glu Gly Val Tyr Arg Ile Lys Gln Gln Gly Ile
 1490 1495 1500
 Phe Gly Lys Thr Gln Val Gly Val Gly Val Gln Lys Glu Gly Val
 1505 1510 1515
 Phe His Thr Met Trp His Val Thr Arg Gly Ala Val Leu Thr Tyr
 1520 1525 1530
 Asn Gly Lys Arg Leu Glu Pro Asn Trp Ala Ser Val Lys Lys Asp
 1535 1540 1545

9869SG2164 Sequence listings_ST25.txt

Leu Ile Ser Tyr Gly Gly Gly Trp Arg Leu Ser Ala Gln Trp Gln
 1550 1555 1560
 Lys Gly Glu Glu Val Gln Val Ile Ala Val Glu Pro Gly Lys Asn
 1565 1570 1575
 Pro Lys Asn Phe Gln Thr Met Pro Gly Ile Phe Gln Thr Thr Thr
 1580 1585 1590
 Gly Glu Ile Gly Ala Ile Ala Leu Asp Phe Lys Pro Gly Thr Ser
 1595 1600 1605
 Gly Ser Pro Ile Ile Asn Arg Glu Gly Lys Val Val Gly Leu Tyr
 1610 1615 1620
 Gly Asn Gly Val Val Thr Lys Asn Gly Gly Tyr Val Ser Gly Ile
 1625 1630 1635
 Ala Gln Thr Asn Ala Glu Pro Asp Gly Pro Thr Pro Glu Leu Glu
 1640 1645 1650
 Glu Glu Met Phe Lys Lys Arg Asn Leu Thr Ile Met Asp Leu His
 1655 1660 1665
 Pro Gly Ser Gly Lys Thr Arg Lys Tyr Leu Pro Ala Ile Val Arg
 1670 1675 1680
 Glu Ala Ile Lys Arg Arg Leu Arg Thr Leu Ile Leu Ala Pro Thr
 1685 1690 1695
 Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Lys Gly Leu Pro
 1700 1705 1710
 Ile Arg Tyr Gln Thr Thr Ala Thr Lys Ser Glu His Thr Gly Lys
 1715 1720 1725
 Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Met Arg Leu
 1730 1735 1740
 Leu Ser Pro Val Arg Val Pro Asn Tyr Asn Leu Ile Ile Met Asp
 1745 1750 1755
 Glu Ala His Phe Thr Asp Pro Ala Ser Ile Ala Ala Arg Gly Tyr
 1760 1765 1770
 Ile Ser Thr Arg Val Gly Met Gly Glu Ala Ala Ala Ile Phe Met
 1775 1780 1785
 Thr Ala Thr Pro Pro Gly Thr Ala Asp Ala Phe Pro Gln Ser Asn
 1790 1795 1800

9869SG2164. Sequence listings_ST25.txt

Ala Pro Ile Gln Asp Glu Glu Arg Asp Ile Pro Glu Arg Ser Trp
 1805 1810 1815
 Asn Ser Gly Asn Asp Trp Ile Thr Asp Phe Ala Gly Lys Thr Val
 1820 1825 1830
 Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Asn Cys
 1835 1840 1845
 Leu Arg Lys Asn Gly Lys Lys Val Ile Gln Leu Ser Arg Lys Thr
 1850 1855 1860
 Phe Asp Thr Glu Tyr Gln Lys Thr Lys Leu Asn Asp Trp Asp Phe
 1865 1870 1875
 Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Lys Ala
 1880 1885 1890
 Asp Arg Val Ile Asp Pro Arg Arg Cys Leu Lys Pro Val Ile Leu
 1895 1900 1905
 Thr Asp Gly Pro Glu Arg Val Ile Leu Ala Gly Pro Met Pro Val
 1910 1915 1920
 Thr Val Ala Ser Ala Ala Gln Arg Arg Gly Arg Val Gly Arg Asn
 1925 1930 1935
 Pro Gln Lys Glu Asn Asp Gln Tyr Ile Phe Thr Gly Gln Pro Leu
 1940 1945 1950
 Asn Asn Asp Glu Asp His Ala His Trp Thr Glu Ala Lys Met Leu
 1955 1960 1965
 Leu Asp Asn Ile Asn Thr Pro Glu Gly Ile Ile Pro Ala Leu Phe
 1970 1975 1980
 Glu Pro Glu Arg Glu Lys Ser Ala Ala Ile Asp Gly Glu Tyr Arg
 1985 1990 1995
 Leu Lys Gly Glu Ser Arg Lys Thr Phe Val Glu Leu Met Arg Arg
 2000 2005 2010
 Gly Asp Leu Pro Val Trp Leu Ala His Lys Val Ala Ser Glu Gly
 2015 2020 2025
 Ile Lys Tyr Thr Asp Arg Lys Trp Cys Phe Asp Gly Glu Arg Asn
 2030 2035 2040
 Asn Gln Ile Leu Glu Glu Asn Met Asp Val Glu Ile Trp Thr Lys
 2045 2050 2055

9869SG2164 Sequence listings_ST25.txt

Glu Gly Glu Lys Lys Lys Leu Arg Pro Arg Trp Leu Asp Ala Arg
 2060 2065 2070
 Thr Tyr Ser Asp Pro Leu Ala Leu Lys Glu Phe Lys Asp Phe Ala
 2075 2080 2085
 Ala Gly Arg Lys Ser Ile Ala Leu Asp Leu Val Thr Glu Ile Gly
 2090 2095 2100
 Arg Val Pro Ser His Leu Ala His Arg Thr Arg Asn Ala Leu Asp
 2105 2110 2115
 Asn Leu Val Met Leu His Thr Ser Glu His Gly Gly Arg Ala Tyr
 2120 2125 2130
 Arg His Ala Val Glu Glu Leu Pro Glu Thr Met Glu Thr Leu Leu
 2135 2140 2145
 Leu Leu Gly Leu Met Ile Leu Leu Thr Gly Gly Ala Met Leu Phe
 2150 2155 2160
 Leu Ile Ser Gly Lys Gly Val Gly Lys Thr Ser Ile Gly Leu Ile
 2165 2170 2175
 Cys Val Val Ala Ser Ser Gly Met Leu Trp Met Ala Asp Ile Pro
 2180 2185 2190
 Leu Gln Trp Ile Ala Ser Ala Ile Val Leu Glu Phe Phe Met Met
 2195 2200 2205
 Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln Asp
 2210 2215 2220
 Asn Gln Leu Ala Tyr Val Val Ile Gly Ile Leu Thr Leu Ala Ala
 2225 2230 2235
 Ile Val Ala Ala Asn Glu Met Gly Leu Leu Glu Thr Thr Lys Arg
 2240 2245 2250
 Asp Leu Gly Met Ser Lys Glu Pro Gly Val Ala Ser Pro Thr Ser
 2255 2260 2265
 Tyr Leu Asp Val Asp Leu His Pro Ala Ser Ala Trp Thr Leu Tyr
 2270 2275 2280
 Ala Val Ala Thr Thr Val Ile Thr Pro Met Leu Arg His Thr Ile
 2285 2290 2295
 Glu Asn Ser Thr Ala Asn Val Ser Leu Ala Ala Ile Ala Asn Gln
 2300 2305 2310

9869SG2164 Sequence listings_ST25.txt

Ala Val Val Leu Met Gly Leu Asp Lys Gly Trp Pro Ile Ser Lys
 2315 2320 2325
 Met Asp Leu Gly Val Pro Leu Leu Ala Leu Gly Cys Tyr Ser Gln
 2330 2335 2340
 Val Asn Pro Leu Thr Leu Thr Ala Ala Val Leu Leu Leu Val Thr
 2345 2350 2355
 His Tyr Ala Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr Arg
 2360 2365 2370
 Glu Ala Gln Lys Arg Thr Ala Ala Gly Ile Met Lys Asn Pro Thr
 2375 2380 2385
 Val Asp Gly Ile Met Thr Ile Asp Leu Asp Pro Val Ile Tyr Asp
 2390 2395 2400
 Ser Lys Phe Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val Leu
 2405 2410 2415
 Cys Ala Val Gln Leu Leu Leu Met Arg Thr Ser Trp Ala Phe Cys
 2420 2425 2430
 Glu Ala Leu Thr Leu Ala Thr Gly Pro Ile Thr Thr Leu Trp Glu
 2435 2440 2445
 Gly Ser Pro Gly Lys Phe Trp Asn Thr Thr Ile Ala Val Ser Met
 2450 2455 2460
 Ala Asn Ile Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Ala
 2465 2470 2475
 Phe Ser Ile Met Lys Ser Val Gly Thr Gly Lys Arg Gly Thr Gly
 2480 2485 2490
 Ser Gln Gly Glu Thr Leu Gly Glu Lys Trp Lys Lys Lys Leu Asn
 2495 2500 2505
 Gln Leu Ser Trp Lys Glu Phe Asp Leu Tyr Lys Lys Ser Gly Ile
 2510 2515 2520
 Thr Glu Val Asp Arg Ile Glu Ala Lys Glu Gly Leu Lys Arg Gly
 2525 2530 2535
 Glu Ile Thr His His Ala Val Ser Arg Gly Ser Ala Ala Leu Gln
 2540 2545 2550
 Trp Phe Val Glu Arg Asn Met Val Ile Pro Glu Gly Arg Val Ile
 2555 2560 2565

9869SG2164 Sequence listings_ST25.txt

Asp Leu Gly Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Cys Ala Gly
 2570 2575 2580
 Leu Lys Lys Val Thr Glu Val Arg Gly Tyr Thr Lys Gly Gly Pro
 2585 2590 2595
 Gly His Glu Glu Pro Val Pro Met Ser Thr Tyr Gly Trp Asn Ile
 2600 2605 2610
 Val Lys Leu Met Ser Gly Lys Asp Val Phe Tyr Leu Pro Pro Glu
 2615 2620 2625
 Lys Cys Asp Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Pro Ser
 2630 2635 2640
 Pro Thr Val Glu Glu Ser Arg Thr Ile Arg Val Leu Lys Met Val
 2645 2650 2655
 Glu Pro Trp Leu Lys Asn Asn Gln Phe Cys Ile Lys Val Leu Asn
 2660 2665 2670
 Pro Tyr Met Pro Ala Val Ile Glu His Leu Glu Arg Leu Gln Arg
 2675 2680 2685
 Lys His Gly Gly Met Leu Val Arg Asn Pro Leu Ser Arg Asn Ser
 2690 2695 2700
 Thr His Ala Met Tyr Trp Ile Ser Asn Gly Thr Gly Asn Ile Val
 2705 2710 2715
 Ser Ser Val Asn Met Val Ser Arg Leu Leu Leu Asn Arg Phe Thr
 2720 2725 2730
 Met Thr Tyr Arg Lys Pro Thr Ile Glu Lys Asp Val Asp Leu Gly
 2735 2740 2745
 Ala Gly Thr Arg His Val Asn Ala Glu Pro Glu Thr Pro Asn Met
 2750 2755 2760
 Asp Val Ile Gly Glu Arg Ile Arg Arg Ile Lys Glu Glu His Ser
 2765 2770 2775
 Ser Thr Trp His Tyr Asp Asp Glu Asn Pro Tyr Lys Thr Trp Ala
 2780 2785 2790
 Tyr His Gly Ser Tyr Glu Val Lys Ala Thr Gly Ser Ala Ser Ser
 2795 2800 2805
 Met Ile Asn Gly Val Val Lys Leu Leu Thr Lys Pro Trp Asp Val
 2810 2815 2820

9869SG2164 Sequence listings_ST25.txt

Val Pro Thr Val Thr Gln Met Ala Met Thr Asp Thr Thr Pro Phe
 2825 2830 2835
 Gly Gln Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Pro
 2840 2845 2850
 Lys Pro Met Pro Gly Thr Arg Lys Val Met Glu Ile Thr Ala Glu
 2855 2860 2865
 Trp Leu Trp Arg Thr Leu Gly Arg Asn Lys Arg Pro Arg Leu Cys
 2870 2875 2880
 Thr Arg Glu Glu Phe Thr Lys Lys Val Arg Thr Asn Ala Ala Met
 2885 2890 2895
 Gly Ala Val Phe Thr Glu Glu Asn Gln Trp Asp Ser Ala Arg Ala
 2900 2905 2910
 Ala Val Glu Asp Glu Glu Phe Trp Lys Leu Val Asp Arg Glu Arg
 2915 2920 2925
 Glu Leu His Lys Leu Gly Lys Cys Gly Ser Cys Val Tyr Asn Met
 2930 2935 2940
 Met Gly Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Lys Ala Lys
 2945 2950 2955
 Gly Ser Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Tyr Leu
 2960 2965 2970
 Glu Phe Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser
 2975 2980 2985
 Arg Glu Asn Ser Tyr Ser Gly Val Glu Gly Glu Gly Leu His Lys
 2990 2995 3000
 Leu Gly Tyr Ile Leu Arg Asp Ile Ser Lys Ile Pro Gly Gly Ala
 3005 3010 3015
 Met Tyr Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Glu
 3020 3025 3030
 Asp Asp Leu His Asn Glu Glu Lys Ile Thr Gln Gln Met Asp Pro
 3035 3040 3045
 Glu His Arg Gln Leu Ala Asn Ala Ile Phe Lys Leu Thr Tyr Gln
 3050 3055 3060
 Asn Lys Val Val Lys Val Gln Arg Pro Thr Pro Lys Gly Thr Val
 3065 3070 3075

9869SG2164 Sequence listings_ST25.txt

Met Asp Ile Ile Ser Arg Lys Asp Gln Arg Gly Ser Gly Gln Val
 3080 3085 3090
 Gly Thr Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Ala Gln Leu
 3095 3100 3105
 Ile Arg Gln Met Glu Gly Glu Gly Val Leu Ser Lys Thr Asp Leu
 3110 3115 3120
 Glu Asn Pro His Leu Leu Glu Lys Lys Ile Thr Gln Trp Leu Glu
 3125 3130 3135
 Thr Lys Gly Val Glu Arg Leu Lys Arg Met Ala Ile Ser Gly Asp
 3140 3145 3150
 Asp Cys Val Val Lys Pro Ile Asp Asp Arg Phe Ala Asn Ala Leu
 3155 3160 3165
 Leu Ala Leu Asn Asp Met Gly Lys Val Arg Lys Asp Ile Pro Gln
 3170 3175 3180
 Trp Gln Pro Ser Lys Gly Trp Gln Asp Trp Gln Gln Val Pro Phe
 3185 3190 3195
 Cys Ser His His Phe His Glu Leu Ile Met Lys Asp Gly Arg Lys
 3200 3205 3210
 Leu Val Val Pro Cys Arg Pro Gln Asp Glu Leu Ile Gly Arg Ala
 3215 3220 3225
 Arg Ile Ser Gln Gly Ala Gly Trp Ser Leu Lys Glu Thr Ala Cys
 3230 3235 3240
 Leu Gly Lys Ala Tyr Ala Gln Met Trp Ala Leu Met Tyr Phe His
 3245 3250 3255
 Arg Arg Asp Leu Arg Leu Ala Ser Asn Ala Ile Cys Ser Ala Val
 3260 3265 3270
 Pro Val His Trp Val Pro Thr Ser Arg Thr Thr Trp Ser Ile His
 3275 3280 3285
 Ala His His Gln Trp Met Thr Thr Glu Asp Met Leu Thr Val Trp
 3290 3295 3300
 Asn Arg Val Trp Ile Glu Asp Asn Pro Trp Met Glu Asp Lys Thr
 3305 3310 3315
 Pro Val Thr Thr Trp Glu Asp Val Pro Tyr Leu Gly Lys Arg Glu
 3320 3325 3330

9869SG2164 Sequence listings_ST25.txt

Asp Gln Trp Cys Gly Ser Leu Ile Gly Leu Thr Ser Arg Ala Thr
 3335 3340 3345

Trp Ala Gln Asn Ile Leu Thr Ala Ile Gln Gln Val Arg Ser Leu
 3350 3355 3360

Ile Gly Asn Glu Glu Phe Leu Asp Tyr Met Pro Ser Met Lys Arg
 3365 3370 3375

Phe Arg Lys Glu Glu Glu Ser Glu Gly Ala Ile Trp
 3380 3385 3390

<210> 12
 <211> 3387
 <212> PRT
 <213> Dengue virus type 4

<220>
 <221> MISC_FEATURE
 <222> (2488)..(3387)
 <223> Non-structural protein 5 of DENV-4 MT mutant passage 5

<220>
 <221> MISC_FEATURE
 <222> (2548)..(2548)
 <223> Mutation from Lys to Ala

<220>
 <221> MISC_FEATURE
 <222> (2704)..(2704)
 <223> Mutation from Glu to Ala

<400> 12

Met Asn Gln Arg Lys Lys Val Val Arg Pro Pro Phe Asn Met Leu Lys
 1 5 10 15

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

Ser Thr Gly Leu Phe Ser Gly Lys Gly Pro Leu Arg Met Val Leu Ala
 35 40 45

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

Leu Lys Arg Trp Gly Gln Leu Lys Lys Asn Lys Ala Ile Lys Ile Leu
 65 70 75 80

Ile Gly Phe Arg Lys Glu Ile Gly Arg Met Leu Asn Ile Leu Asn Arg
 85 90 95

Arg Arg Arg Ser Thr Met Thr Leu Leu Cys Leu Ile Pro Thr Val Met
 100 105 110

9869SG2164 Sequence listings_ST25.txt

Ala Phe His Leu Ser Thr Arg Asp Gly Glu Pro Leu Met Ile Val Ala
 115 120 125

Lys His Glu Arg Gly Arg Pro Leu Leu Phe Lys Thr Thr Glu Gly Ile
 130 135 140

Asn Lys Cys Thr Leu Ile Ala Met Asp Leu Gly Glu Met Cys Glu Asp
 145 150 155 160

Thr Val Thr Tyr Lys Cys Pro Leu Leu Val Asn Thr Glu Pro Glu Asp
 165 170 175

Ile Asp Cys Trp Cys Asn Leu Thr Ser Thr Trp Val Met Tyr Gly Thr
 180 185 190

Cys Thr Gln Ser Gly Glu Arg Arg Arg Glu Lys Arg Ser Val Ala Leu
 195 200 205

Thr Pro His Ser Gly Met Gly Leu Glu Thr Arg Ala Glu Thr Trp Met
 210 215 220

Ser Ser Glu Gly Ala Trp Lys His Ala Gln Arg Val Glu Ser Trp Ile
 225 230 235 240

Leu Arg Asn Pro Gly Phe Ala Leu Leu Ala Gly Phe Met Ala Tyr Met
 245 250 255

Ile Gly Gln Thr Gly Ile Gln Arg Thr Val Phe Phe Val Leu Met Met
 260 265 270

Leu Val Ala Pro Ser Tyr Gly Met Arg Cys Val Gly Val Gly Asn Arg
 275 280 285

Asp Phe Val Glu Gly Val Ser Gly Gly Ala Trp Val Asp Leu Val Leu
 290 295 300

Glu His Gly Gly Cys Val Thr Thr Met Ala Gln Gly Lys Pro Thr Leu
 305 310 315 320

Asp Phe Glu Leu Thr Lys Thr Thr Ala Lys Glu Val Ala Leu Leu Arg
 325 330 335

Thr Tyr Cys Ile Glu Ala Ser Ile Ser Asn Ile Thr Thr Ala Thr Arg
 340 345 350

Cys Pro Thr Gln Gly Glu Pro Tyr Leu Lys Glu Glu Gln Asp Gln Gln
 355 360 365

Tyr Ile Cys Arg Arg Asp Val Val Asp Arg Gly Trp Gly Asn Gly Cys
 370 375 380

9869SG2164 Sequence listings_ST25.txt

Gly Leu Phe Gly Lys Gly Gly Val Val Thr Cys Ala Lys Phe Ser Cys
385 390 395 400

Ser Gly Lys Ile Thr Gly Asn Leu Val Gln Ile Glu Asn Leu Glu Tyr
405 410 415

Thr Val Val Val Thr Val His Asn Gly Asp Thr His Ala Val Gly Asn
420 425 430

Asp Thr Ser Asn His Gly Val Thr Ala Thr Ile Thr Pro Arg Ser Pro
435 440 445

Ser Val Glu Val Lys Leu Pro Asp Tyr Gly Glu Leu Thr Leu Asp Cys
450 455 460

Glu Pro Arg Ser Gly Ile Asp Phe Asn Glu Met Ile Leu Met Lys Met
465 470 475 480

Lys Lys Lys Thr Trp Leu Val His Lys Gln Trp Phe Leu Asp Leu Pro
485 490 495

Leu Pro Trp Thr Ala Gly Ala Asp Thr Ser Glu Val His Trp Asn Tyr
500 505 510

Lys Glu Arg Met Val Thr Phe Lys Val Pro His Ala Lys Arg Gln Asp
515 520 525

Val Thr Val Leu Gly Ser Gln Glu Gly Ala Met His Ser Ala Leu Ala
530 535 540

Gly Ala Thr Glu Val Asp Ser Gly Asp Gly Asn His Met Phe Ala Gly
545 550 555 560

His Leu Lys Cys Lys Val Arg Met Glu Lys Leu Arg Ile Lys Gly Met
565 570 575

Ser Tyr Thr Met Cys Ser Gly Lys Phe Ser Ile Asp Lys Glu Met Ala
580 585 590

Glu Thr Gln His Gly Thr Ala Val Val Lys Val Lys Tyr Glu Gly Ala
595 600 605

Gly Ala Pro Cys Lys Ile Pro Ile Glu Ile Arg Asp Val Asn Lys Glu
610 615 620

Lys Val Val Gly Arg Ile Ile Ser Ser Thr Pro Phe Ala Glu Asn Thr
625 630 635 640

Asn Ser Val Thr Asn Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser Tyr
645 650 655

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Ile Val Ile Gly Val Gly Asn Ser Ala Leu Thr Leu His Trp Phe Arg
660 665 670

Lys Gly Ser Ser Ile Gly Lys Met Phe Glu Ser Thr Tyr Arg Gly Ala
675 680 685

Lys Arg Met Ala Ile Leu Gly Glu Thr Ala Trp Asp Phe Gly Ser Val
690 695 700

Gly Gly Leu Phe Thr Ser Leu Gly Lys Ala Val His Gln Val Phe Gly
705 710 715 720

Ser Val Tyr Thr Thr Met Phe Gly Gly Val Ser Trp Ile Ile Arg Ile
725 730 735

Leu Ile Gly Leu Leu Val Leu Trp Ile Gly Thr Asn Ser Arg Asn Thr
740 745 750

Ser Met Ala Met Thr Cys Ile Ala Val Gly Gly Ile Thr Leu Phe Leu
755 760 765

Gly Phe Thr Val Gln Ala Asp Met Gly Cys Val Val Ser Trp Asn Gly
770 775 780

Lys Glu Leu Lys Cys Gly Ser Gly Ile Phe Val Val Asp Asn Val His
785 790 795 800

Thr Trp Thr Glu Gln Tyr Lys Phe Gln Pro Glu Ser Pro Ala Arg Leu
805 810 815

Ala Ser Ala Ile Leu Asn Ala His Lys Asp Gly Val Cys Gly Ile Arg
820 825 830

Ser Thr Thr Arg Leu Glu Asn Val Met Trp Lys Gln Ile Thr Asn Glu
835 840 845

Leu Asn Tyr Val Leu Trp Glu Gly Gly His Asp Leu Thr Val Val Ala
850 855 860

Gly Asp Val Lys Gly Val Leu Thr Lys Gly Lys Arg Ala Leu Thr Pro
865 870 875 880

Pro Val Asn Asp Leu Lys Tyr Ser Trp Lys Thr Trp Gly Lys Ala Lys
885 890 895

Ile Phe Thr Pro Glu Ala Arg Asn Ser Thr Phe Leu Ile Asp Gly Pro
900 905 910

Asp Thr Ser Glu Cys Pro Asn Glu Arg Arg Ala Trp Asn Phe Phe Glu
915 920 925

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Val Glu Asp Tyr Gly Phe Gly Met Phe Thr Thr Asn Ile Trp Met Lys
 930 935 940

Phe Arg Glu Gly Ser Ser Glu Val Cys Asp His Arg Leu Met Ser Ala
 945 950 955 960

Ala Ile Lys Asp Gln Lys Ala Val His Ala Asp Met Gly Tyr Trp Ile
 965 970 975

Glu Ser Ser Lys Asn Gln Thr Trp Gln Ile Glu Lys Ala Ser Leu Ile
 980 985 990

Glu Val Lys Thr Cys Leu Trp Pro Lys Thr His Thr Leu Trp Ser Asn
 995 1000 1005

Gly Val Leu Glu Ser Gln Met Leu Ile Pro Arg Ser Tyr Ala Gly
 1010 1015 1020

Pro Phe Ser Gln His Asn Tyr Arg Gln Gly Tyr Ala Thr Gln Thr
 1025 1030 1035

Val Gly Pro Trp His Leu Gly Lys Leu Glu Ile Asp Phe Gly Glu
 1040 1045 1050

Cys Pro Gly Thr Thr Val Thr Ile Gln Glu Asp Cys Asp His Arg
 1055 1060 1065

Gly Pro Ser Leu Arg Thr Thr Thr Ala Ser Gly Lys Leu Val Thr
 1070 1075 1080

Gln Trp Cys Cys Arg Ser Cys Thr Met Pro Pro Leu Arg Phe Leu
 1085 1090 1095

Gly Glu Asp Gly Cys Trp Tyr Gly Met Glu Ile Arg Pro Leu Ser
 1100 1105 1110

Glu Lys Glu Glu Asn Met Val Lys Ser Gln Val Thr Ala Gly Gln
 1115 1120 1125

Gly Thr Ser Glu Thr Phe Ser Met Gly Leu Leu Cys Leu Thr Leu
 1130 1135 1140

Phe Val Glu Glu Cys Leu Arg Arg Arg Val Thr Arg Lys His Met
 1145 1150 1155

Ile Leu Val Val Val Ile Thr Phe Cys Ala Ile Ile Leu Gly Gly
 1160 1165 1170

Leu Thr Trp Met Asp Leu Leu Arg Ala Leu Ile Met Leu Gly Asp
 1175 1180 1185

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Thr Met Ser Gly Arg Ile Gly Gly Gln Ile His Leu Ala Ile Met
1190 1195 1200

Ala Val Phe Lys Met Ser Pro Gly Tyr Val Leu Gly Val Phe Leu
1205 1210 1215

Arg Lys Leu Thr Ser Arg Glu Thr Ala Leu Met Val Ile Gly Met
1220 1225 1230

Ala Met Thr Thr Val Phe Ser Ile Pro His Asp Leu Met Glu Leu
1235 1240 1245

Ile Asp Gly Ile Ser Leu Gly Leu Ile Leu Leu Lys Ile Val Thr
1250 1255 1260

His Phe Asp Asn Thr Gln Val Gly Thr Leu Ala Leu Ser Leu Thr
1265 1270 1275

Phe Ile Arg Ser Thr Thr Pro Leu Val Met Ala Trp Arg Thr Ile
1280 1285 1290

Met Ala Val Phe Phe Val Val Thr Leu Ile Pro Leu Cys Arg Thr
1295 1300 1305

Ser Cys Leu Gln Lys Gln Ser His Trp Val Glu Ile Thr Ala Leu
1310 1315 1320

Ile Leu Gly Ala Gln Ala Leu Pro Val Tyr Leu Met Thr Leu Met
1325 1330 1335

Lys Gly Ala Ser Arg Arg Ser Trp Pro Leu Asn Glu Gly Ile Met
1340 1345 1350

Ala Val Gly Leu Val Ser Leu Leu Gly Ser Ala Leu Leu Lys Asn
1355 1360 1365

Asp Val Pro Leu Ala Gly Pro Met Val Ala Gly Gly Leu Leu Leu
1370 1375 1380

Ala Ala Tyr Val Met Ser Gly Ser Ser Ala Asp Leu Ser Leu Glu
1385 1390 1395

Lys Ala Ala Asn Val Gln Trp Asp Glu Met Ala Asp Ile Thr Gly
1400 1405 1410

Ser Ser Pro Ile Ile Glu Val Lys Gln Asp Glu Asp Gly Ser Phe
1415 1420 1425

Ser Ile Arg Asp Val Glu Glu Thr Asn Met Ile Thr Leu Leu Val
1430 1435 1440

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Lys Leu Ala Leu Ile Thr Val Ser Gly Leu Tyr Pro Leu Ala Ile
 1445 1450 1455
 Pro Val Thr Met Ala Leu Trp Tyr Ile Trp Gln Val Lys Thr Gln
 1460 1465 1470
 Arg Ser Gly Ala Leu Trp Asp Val Pro Ser Pro Ala Ala Thr Gln
 1475 1480 1485
 Lys Ala Thr Leu Ser Glu Gly Val Tyr Arg Ile Met Gln Arg Gly
 1490 1495 1500
 Leu Phe Gly Lys Thr Gln Val Gly Val Gly Ile His Met Glu Gly
 1505 1510 1515
 Val Phe His Thr Met Trp His Val Thr Arg Gly Ser Val Ile Cys
 1520 1525 1530
 His Glu Thr Gly Arg Leu Glu Pro Ser Trp Ala Asp Val Arg Asn
 1535 1540 1545
 Asp Met Ile Ser Tyr Gly Gly Gly Trp Arg Leu Gly Asp Lys Trp
 1550 1555 1560
 Asp Lys Glu Glu Asp Val Gln Val Leu Ala Ile Glu Pro Gly Lys
 1565 1570 1575
 Asn Pro Lys His Val Gln Thr Lys Pro Gly Leu Phe Lys Thr Leu
 1580 1585 1590
 Thr Gly Glu Ile Gly Ala Val Thr Leu Asp Phe Lys Pro Gly Thr
 1595 1600 1605
 Ser Gly Ser Pro Ile Ile Asn Lys Lys Gly Lys Val Ile Gly Leu
 1610 1615 1620
 Tyr Gly Asn Gly Val Val Thr Lys Ser Gly Asp Tyr Val Ser Ala
 1625 1630 1635
 Ile Thr Gln Ala Glu Arg Ile Gly Glu Pro Asp Tyr Glu Val Asp
 1640 1645 1650
 Glu Asp Ile Phe Arg Lys Lys Arg Leu Thr Ile Met Asp Leu His
 1655 1660 1665
 Pro Gly Ala Gly Lys Thr Lys Arg Ile Leu Pro Ser Ile Val Arg
 1670 1675 1680
 Glu Ala Leu Lys Arg Arg Leu Arg Thr Leu Ile Leu Ala Pro Thr
 1685 1690 1695

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Arg Val Val Ala Ala Glu Met Glu Glu Ala Leu Arg Gly Leu Pro
 1700 1705 1710
 Ile Arg Tyr Gln Thr Pro Ala Val Lys Ser Asp His Thr Gly Arg
 1715 1720 1725
 Glu Ile Val Asp Leu Met Cys His Ala Thr Phe Thr Thr Arg Leu
 1730 1735 1740
 Leu Ser Ser Thr Arg Val Pro Asn Tyr Asn Leu Ile Val Met Asp
 1745 1750 1755
 Glu Ala His Phe Thr Asp Pro Cys Ser Val Ala Ala Arg Gly Tyr
 1760 1765 1770
 Ile Ser Thr Arg Val Glu Met Gly Glu Ala Ala Ala Ile Phe Met
 1775 1780 1785
 Thr Ala Thr Pro Pro Gly Ser Ile Asp Pro Phe Pro Gln Ser Asn
 1790 1795 1800
 Ser Pro Ile Glu Asp Ile Glu Arg Glu Ile Pro Glu Arg Ser Trp
 1805 1810 1815
 Asn Thr Gly Phe Asp Trp Ile Thr Asp Tyr Gln Gly Lys Thr Val
 1820 1825 1830
 Trp Phe Val Pro Ser Ile Lys Ala Gly Asn Asp Ile Ala Asn Cys
 1835 1840 1845
 Leu Arg Lys Ser Gly Lys Arg Val Ile Gln Leu Ser Arg Lys Thr
 1850 1855 1860
 Phe Asp Thr Glu Tyr Pro Lys Thr Lys Leu Thr Asp Trp Asp Phe
 1865 1870 1875
 Val Val Thr Thr Asp Ile Ser Glu Met Gly Ala Asn Phe Arg Ala
 1880 1885 1890
 Gly Arg Val Ile Asp Pro Arg Arg Cys Leu Lys Pro Val Ile Leu
 1895 1900 1905
 Thr Asp Gly Pro Glu Arg Val Ile Leu Ala Gly Pro Ile Pro Val
 1910 1915 1920
 Thr Pro Ala Ser Ala Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn
 1925 1930 1935
 Pro Ala Gln Glu Asp Asp Gln Tyr Val Phe Ser Gly Asp Pro Leu
 1940 1945 1950

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Lys Asn Asp Glu Asp His Ala His Trp Thr Glu Ala Lys Met Leu
 1955 1960 1965
 Leu Asp Asn Ile Tyr Thr Pro Glu Gly Ile Ile Pro Thr Leu Phe
 1970 1975 1980
 Gly Pro Glu Arg Glu Lys Thr Gln Ala Ile Asp Gly Glu Phe Arg
 1985 1990 1995
 Leu Arg Gly Glu Gln Arg Lys Thr Phe Val Glu Leu Met Arg Arg
 2000 2005 2010
 Gly Asp Leu Pro Val Trp Leu Ser Tyr Lys Val Ala Ser Ala Gly
 2015 2020 2025
 Ile Ser Tyr Lys Asp Arg Glu Trp Cys Phe Thr Gly Glu Arg Asn
 2030 2035 2040
 Asn Gln Ile Leu Glu Glu Asn Met Glu Val Glu Ile Trp Thr Arg
 2045 2050 2055
 Glu Gly Glu Lys Lys Lys Leu Arg Pro Lys Trp Leu Asp Ala Arg
 2060 2065 2070
 Val Tyr Ala Asp Pro Met Ala Leu Lys Asp Phe Lys Glu Phe Ala
 2075 2080 2085
 Ser Gly Arg Lys Ser Ile Thr Leu Asp Ile Leu Thr Glu Ile Ala
 2090 2095 2100
 Thr Leu Pro Thr Tyr Leu Ser Ser Lys Ala Lys Leu Ala Leu Asp
 2105 2110 2115
 Asn Ile Val Met Leu His Thr Thr Glu Lys Gly Gly Arg Ala Tyr
 2120 2125 2130
 Gln His Ala Leu Asn Glu Leu Pro Glu Ser Leu Glu Thr Leu Met
 2135 2140 2145
 Leu Val Ala Leu Leu Gly Ala Met Thr Ala Gly Ile Phe Leu Phe
 2150 2155 2160
 Phe Met Gln Gly Lys Gly Ile Gly Lys Leu Ser Met Gly Leu Ile
 2165 2170 2175
 Ala Ile Ala Val Ala Ser Gly Leu Leu Trp Val Ala Glu Ile Gln
 2180 2185 2190
 Pro Gln Trp Ile Ala Ala Ser Ile Ile Leu Glu Phe Phe Leu Met
 2195 2200 2205

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Val Leu Leu Ile Pro Glu Pro Glu Lys Gln Arg Thr Pro Gln Asp
 2210 2215 2220

 Asn Gln Leu Ile Tyr Val Ile Leu Thr Ile Leu Thr Ile Ile Gly
 2225 2230 2235

 Leu Ile Ala Ala Asn Glu Met Gly Leu Ile Glu Lys Thr Lys Thr
 2240 2245 2250

 Asp Phe Gly Phe Tyr Gln Val Lys Thr Glu Thr Thr Ile Leu Asp
 2255 2260 2265

 Val Asp Leu Arg Pro Ala Ser Ala Trp Thr Leu Tyr Ala Val Ala
 2270 2275 2280

 Thr Thr Ile Leu Thr Pro Met Leu Arg His Thr Ile Glu Asn Thr
 2285 2290 2295

 Ser Ala Asn Leu Ser Leu Ala Ala Ile Ala Asn Gln Ala Ala Val
 2300 2305 2310

 Leu Met Gly Leu Gly Lys Gly Trp Pro Leu His Arg Met Asp Leu
 2315 2320 2325

 Gly Val Pro Leu Leu Ala Met Gly Cys Tyr Ser Gln Val Asn Pro
 2330 2335 2340

 Thr Thr Leu Thr Ala Ser Leu Val Met Leu Leu Val His Tyr Ala
 2345 2350 2355

 Ile Ile Gly Pro Gly Leu Gln Ala Lys Ala Thr Arg Glu Ala Gln
 2360 2365 2370

 Lys Arg Thr Ala Ala Gly Ile Met Lys Asn Pro Thr Val Asp Gly
 2375 2380 2385

 Ile Thr Val Ile Asp Leu Glu Pro Ile Ser Tyr Asp Pro Lys Phe
 2390 2395 2400

 Glu Lys Gln Leu Gly Gln Val Met Leu Leu Val Leu Cys Val Gly
 2405 2410 2415

 Gln Leu Leu Leu Met Arg Thr Thr Trp Ala Leu Cys Glu Val Leu
 2420 2425 2430

 Thr Leu Ala Thr Gly Pro Ile Met Thr Leu Trp Glu Gly Asn Pro
 2435 2440 2445

 Gly Arg Phe Trp Asn Thr Thr Ile Ala Val Ser Thr Ala Asn Ile
 2450 2455 2460

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Phe Arg Gly Ser Tyr Leu Ala Gly Ala Gly Leu Ala Phe Ser Leu
 2465 2470 2475

 Ile Lys Asn Val Gln Thr Pro Arg Arg Gly Thr Gly Thr Thr Gly
 2480 2485 2490

 Glu Thr Leu Gly Glu Lys Trp Lys Arg Gln Leu Asn Ser Leu Asp
 2495 2500 2505

 Arg Lys Glu Phe Glu Glu Tyr Lys Arg Ser Gly Ile Leu Glu Val
 2510 2515 2520

 Asp Arg Thr Glu Ala Lys Ser Ala Leu Arg Asp Gly Ser Lys Ile
 2525 2530 2535

 Lys His Ala Val Ser Arg Gly Ser Ser Ala Ile Arg Trp Ile Val
 2540 2545 2550

 Glu Arg Gly Met Ile Lys Pro Lys Gly Lys Val Val Asp Leu Gly
 2555 2560 2565

 Cys Gly Arg Gly Gly Trp Ser Tyr Tyr Met Ala Thr Leu Lys Asn
 2570 2575 2580

 Val Thr Glu Val Lys Gly Tyr Thr Lys Gly Gly Pro Gly His Glu
 2585 2590 2595

 Glu Pro Ile Pro Met Ala Thr Tyr Gly Trp Asn Leu Val Lys Leu
 2600 2605 2610

 His Ser Gly Val Asp Val Phe Tyr Lys Pro Thr Glu Gln Val Asp
 2615 2620 2625

 Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Ser Asn Pro Thr Ile
 2630 2635 2640

 Glu Glu Gly Arg Thr Leu Arg Val Leu Lys Met Val Glu Pro Trp
 2645 2650 2655

 Leu Ser Ser Lys Pro Glu Phe Cys Ile Lys Val Leu Asn Pro Tyr
 2660 2665 2670

 Met Pro Thr Val Ile Glu Glu Leu Glu Lys Leu Gln Arg Arg His
 2675 2680 2685

 Gly Gly Ser Leu Val Arg Cys Pro Leu Ser Arg Asn Ser Thr His
 2690 2695 2700

 Ala Met Tyr Trp Val Ser Gly Ala Ser Gly Asn Ile Val Ser Ser
 2705 2710 2715

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Val Asn Thr Ile Ser Lys Met Leu Leu Asn Arg Phe Thr Thr Arg
 2720 2725 2730
 His Arg Lys Pro Thr Tyr Glu Lys Asp Val Asp Leu Gly Ala Gly
 2735 2740 2745
 Thr Arg Ser Val Ser Thr Glu Thr Glu Lys Pro Asp Met Thr Ile
 2750 2755 2760
 Ile Gly Arg Arg Leu Gln Arg Leu Arg Glu Glu His Lys Glu Thr
 2765 2770 2775
 Trp His Tyr Asp Gln Glu Asn Pro Tyr Arg Thr Trp Ala Tyr His
 2780 2785 2790
 Gly Ser Tyr Glu Ala Pro Ser Thr Gly Ser Ala Ser Ser Met Val
 2795 2800 2805
 Asn Gly Val Val Lys Leu Leu Thr Lys Pro Trp Asp Val Ile Pro
 2810 2815 2820
 Met Val Thr Gln Leu Ala Met Thr Asp Thr Thr Pro Phe Gly Gln
 2825 2830 2835
 Gln Arg Val Phe Lys Glu Lys Val Asp Thr Arg Thr Pro Gln Pro
 2840 2845 2850
 Lys Pro Gly Thr Arg Met Ile Met Thr Thr Thr Ala Asn Trp Leu
 2855 2860 2865
 Trp Ala Leu Leu Gly Lys Lys Lys Asn Pro Arg Leu Cys Thr Arg
 2870 2875 2880
 Glu Glu Phe Ile Ser Lys Val Arg Ser Asn Ala Ala Ile Gly Ala
 2885 2890 2895
 Val Phe Gln Glu Glu Gln Gly Trp Thr Ser Ala Ser Glu Ala Val
 2900 2905 2910
 Asn Asp Ser Arg Phe Trp Glu Leu Val Asp Lys Glu Arg Ala Leu
 2915 2920 2925
 His Gln Glu Gly Lys Cys Glu Ser Cys Val Tyr Asn Met Met Gly
 2930 2935 2940
 Lys Arg Glu Lys Lys Leu Gly Glu Phe Gly Arg Ala Lys Gly Ser
 2945 2950 2955
 Arg Ala Ile Trp Tyr Met Trp Leu Gly Ala Arg Phe Leu Glu Phe
 2960 2965 2970

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Glu Ala Leu Gly Phe Leu Asn Glu Asp His Trp Phe Ser Arg Glu
 2975 2980 2985
 Asn Ser Trp Ser Gly Val Glu Gly Glu Gly Leu His Arg Leu Gly
 2990 2995 3000
 Tyr Ile Leu Glu Asp Ile Asp Lys Lys Asp Gly Asp Leu Ile Tyr
 3005 3010 3015
 Ala Asp Asp Thr Ala Gly Trp Asp Thr Arg Ile Thr Glu Asp Asp
 3020 3025 3030
 Leu Leu Asn Glu Glu Leu Ile Thr Glu Gln Met Ala Pro His His
 3035 3040 3045
 Lys Thr Leu Ala Lys Ala Ile Phe Lys Leu Thr Tyr Gln Asn Lys
 3050 3055 3060
 Val Val Lys Val Leu Arg Pro Thr Pro Lys Gly Ala Val Met Asp
 3065 3070 3075
 Ile Ile Ser Arg Lys Asp Gln Arg Gly Ser Gly Gln Val Gly Thr
 3080 3085 3090
 Tyr Gly Leu Asn Thr Phe Thr Asn Met Glu Val Gln Leu Ile Arg
 3095 3100 3105
 Gln Met Glu Ala Glu Gly Val Ile Thr Gln Asp Asp Met Gln Asn
 3110 3115 3120
 Pro Lys Gly Leu Lys Glu Arg Val Glu Lys Trp Leu Lys Glu Cys
 3125 3130 3135
 Gly Val Asp Arg Leu Lys Arg Met Ala Ile Ser Gly Asp Asp Cys
 3140 3145 3150
 Val Val Lys Pro Leu Asp Glu Arg Phe Ser Thr Ser Leu Leu Phe
 3155 3160 3165
 Leu Asn Asp Met Gly Lys Val Arg Lys Asp Ile Pro Gln Trp Glu
 3170 3175 3180
 Pro Ser Lys Gly Trp Lys Asn Trp Gln Glu Val Pro Phe Cys Ser
 3185 3190 3195
 His His Phe His Lys Ile Phe Met Lys Asp Gly Arg Ser Leu Val
 3200 3205 3210
 Val Pro Cys Arg Asn Gln Asp Glu Leu Ile Gly Arg Ala Arg Ile
 3215 3220 3225

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Ser Gln Gly Ala Gly Trp Ser Leu Arg Glu Thr Ala Cys Leu Gly
 3230 3235 3240

 Lys Ala Tyr Ala Gln Met Trp Ser Leu Met Tyr Phe His Arg Arg
 3245 3250 3255

 Asp Leu Arg Leu Ala Ser Met Ala Ile Cys Ser Ala Val Pro Thr
 3260 3265 3270

 Glu Trp Phe Pro Thr Ser Arg Thr Thr Trp Ser Ile His Ala His
 3275 3280 3285

 His Gln Trp Met Thr Thr Glu Asp Met Leu Lys Val Trp Asn Arg
 3290 3295 3300

 Val Trp Ile Glu Asp Asn Pro Asn Met Thr Asp Lys Thr Pro Val
 3305 3310 3315

 His Ser Trp Glu Asp Ile Pro Tyr Leu Gly Lys Arg Glu Asp Leu
 3320 3325 3330

 Trp Cys Gly Ser Leu Ile Gly Leu Ser Ser Arg Ala Thr Trp Ala
 3335 3340 3345

 Lys Asn Ile His Thr Ala Ile Thr Gln Val Arg Asn Leu Ile Gly
 3350 3355 3360

 Lys Glu Glu Tyr Val Asp Tyr Met Pro Val Met Lys Arg Tyr Ser
 3365 3370 3375

 Ala Pro Ser Glu Ser Glu Gly Val Leu
 3380 3385