SEQUENCE LISTING

<110> Acambis Inc.

<120> Vaccines Against Japanese Encephalitis Virus and West Nile Virus

<130> 06132/099WO3

<140> PCT/US05/37369
<141> 2005-10-19

<150> US 60/718,923
<151> 2005-09-19

<150> US 60/674,546
<151> 2005-04-25

<150> US 60/674,415
<151> 2005-04-24

<150> US 60/620,948
<151> 2004-10-21

<150> US 60/620,466
<151> 2004-10-20

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<170> PatentIn version 3.3

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Met Ser Gly Arg Lys Ala Gln Gly Lys Thr Leu Gly Val Asn Met Val
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Arg Arg Gly Val Arg Ser Leu Ser Asn Lys Ile Lys Gln Lys Thr Lys
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Gln Ile Gly Asn Arg Pro Gly Pro Ser Arg Gly Val Gln Gly Phe Ile
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Leu Ser Ala Gly Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys Thr Lys
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Ile Met Ser Lys Asp Lys Pro Thr Ile Asp Val Lys Met Met Asn Met
325 330 335

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

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Lys Thr Phe Leu Val His Arg Glu Trp Phe Met Asp Leu Asn Leu Pro
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Glu Phe Glu Glu Pro His Ala Thr Lys Gln Ser Val Ile Ala Leu Gly
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Glu Phe Ser Ser Asn Thr Val Lys Leu Thr Ser Gly His Leu Lys Cys
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Cys Ser Lys Ala Phe Lys Phe Leu Arg Thr Pro Val Asp Thr Gly His
595 600 605

ggc act gtg gtg ttg gaa ttg cag tac act ggc acg gat gga cct tgc 1990
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610 615 620

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900 905 910

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His Glu Met Asn Asn Gly Gly Asp Ala Met Tyr Met Ala Leu Ile
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Leu His Pro Phe Ala Leu Leu Leu Val Leu Ala Gly Trp Leu Phe
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His Val Arg Gly Ala Arg Arg Ser Gly Asp Val Leu Trp Asp Ile
1490 1495 1500

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Val Ala Leu Asp Tyr Pro Ser Gly Thr Ser Gly Ser Pro Ile Val
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Asn Arg Asn Gly Glu Val Ile Gly Leu Tyr Gly Asn Gly Ile Leu
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Val Gly Asp Asn Ser Phe Val Ser Ala Ile Ser Gln Thr Glu Val
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Lys Glu Glu Gly Lys Glu Glu Leu Gln Glu Ile Pro Thr Met Leu
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Lys Thr Arg Arg Phe Leu Pro Gln Ile Leu Ala Glu Cys Ala Arg
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Arg Arg Leu Arg Thr Leu Val Leu Ala Pro Thr Arg Val Val Leu
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Ser Glu Met Lys Glu Ala Phe His Gly Leu Asp Val Lys Phe His
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1775 1780 1785

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Leu Asp Pro Ala Ser Ile Ala Ala Arg Gly Trp Ala Ala His Arg
1790 1795 1800

gct agg gca aat gaa agt gca aca atc ttg atg aca gcc aca ccg 5572

Ala Arg Ala Asn Glu Ser Ala Thr Ile Leu Met Thr Ala Thr Pro
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Pro Gly Thr Ser Asp Glu Phe Pro His Ser Asn Gly Glu Ile Glu
1820 1825 1830

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Asp Val Gln Thr Asp Ile Pro Ser Glu Pro Trp Asn Thr Gly His
1835 1840 1845

gac tgg atc ctg gct gac aaa agg ccc acg gca tgg ttc ctt cca 5707
Asp Trp Ile Leu Ala Asp Lys Arg Pro Thr Ala Trp Phe Leu Pro
1850 1855 1860

tcc atc aga gct gca aat gtc atg gct gcc tct ttg cgt aag gct 5752
Ser Ile Arg Ala Ala Asn Val Met Ala Ala Ser Leu Arg Lys Ala
1865 1870 1875

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Gly Lys Ser Val Val Val Leu Asn Arg Lys Thr Phe Glu Arg Glu
1880 1885 1890

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Tyr Pro Thr Ile Lys Gln Lys Lys Pro Asp Phe Ile Leu Ala Thr
1895 1900 1905

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Asp Ile Ala Glu Met Gly Ala Asn Leu Cys Val Glu Arg Val Leu
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Asp Cys Arg Thr Ala Phe Lys Pro Val Leu Val Asp Glu Gly Arg
1925 1930 1935

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Lys Val Ala Ile Lys Gly Pro Leu Arg Ile Ser Ala Ser Ser Ala
1940 1945 1950

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1955 1960 1965

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Asp Ser Tyr Tyr Tyr Ser Glu Pro Thr Ser Glu Asn Asn Ala His
1970 1975 1980

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2150 2155 2160

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2165 2170 2175

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2240 2245 2250

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Leu Ile Ile Gly Ile Leu Thr Leu Val Ser Ala Val Ala Ala Asn
2255 2260 2265

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2270 2275 2280

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2285 2290 2295

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Leu Asp Leu Lys Pro Gly Ala Ala Trp Thr Val Tyr Val Gly Ile
2300 2305 2310

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Val Thr Met Leu Ser Pro Met Leu His His Trp Ile Lys Val Glu
2315 2320 2325

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Tyr Gly Asn Leu Ser Leu Ser Gly Ile Ala Gln Ser Ala Ser Val
2330 2335 2340

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Leu Ser Phe Met Asp Lys Gly Ile Pro Phe Met Lys Met Asn Ile
2345 2350 2355

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Ser Val Ile Met Leu Leu Val Ser Gly Trp Asn Ser Ile Thr Val
2360 2365 2370

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Met Pro Leu Leu Cys Gly Ile Gly Cys Ala Met Leu His Trp Ser
2375 2380 2385

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Leu Ile Leu Pro Gly Ile Lys Ala Gln Gln Ser Lys Leu Ala Gln
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2720 2725 2730

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His Glu Met Tyr Tyr Val Ser Gly Ala Arg Ser Asn Val Thr Phe
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35 40 45

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Leu Lys Arg Leu Trp Lys Met Leu Asp Pro Arg Gln Gly Leu Ala Val
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Leu Arg Lys Val Lys Arg Val Val Ala Ser Leu Met Arg Gly Leu Ser
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Ser Arg Lys Arg Arg Ser His Asp Val Leu Thr Val Gln Phe Leu Ile
100 105 110

Leu Gly Met Leu Leu Met Thr Gly Gly Val Thr Leu Ser Asn Phe Gln
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Gly Lys Val Met Met Thr Val Asn Ala Thr Asp Val Thr Asp Val Ile
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Thr Ile Pro Thr Ala Ala Gly Lys Asn Leu Cys Ile Val Arg Ala Met
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Leu Ser Ala Gly Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys Thr Lys
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195 200 205

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275 280 285

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290 295 300

Gly Ala Thr Trp Val Asp Leu Val Leu Glu Gly Asp Ser Cys Val Thr
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Ile Met Ser Lys Asp Lys Pro Thr Ile Asp Val Lys Met Met Asn Met
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Glu Ala Ala Asn Leu Ala Glu Val Arg Ser Tyr Cys Tyr Leu Ala Thr
340 345 350

Val Ser Asp Leu Ser Thr Lys Ala Ala Cys Pro Thr Met Gly Glu Ala
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His Asn Asp Lys Arg Ala Asp Pro Ala Phe Val Cys Arg Gln Gly Val
370 375 380

Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Phe Phe Gly Lys Gly Ser
385 390 395 400

Ile Asp Thr Cys Ala Lys Phe Ala Cys Ser Thr Lys Ala Ile Gly Arg
405 410 415

Thr Ile Leu Lys Glu Asn Ile Lys Tyr Glu Val Ala Ile Phe Val His
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Gly Pro Thr Thr Val Glu Ser His Gly Asn Tyr Ser Thr Gln Val Gly
435 440 445

Ala Thr Gln Ala Gly Arg Phe Ser Ile Thr Pro Ala Ala Pro Ser Tyr
450 455 460

Thr Leu Lys Leu Gly Glu Tyr Gly Glu Val Thr Val Asp Cys Glu Pro
465 470 475 480

Arg Ser Gly Ile Asp Thr Asn Ala Tyr Tyr Val Met Thr Val Gly Thr
485 490 495

Lys Thr Phe Leu Val His Arg Glu Trp Phe Met Asp Leu Asn Leu Pro
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Trp Ser Ser Ala Gly Ser Thr Val Trp Arg Asn Arg Glu Thr Leu Met
515 520 525

Glu Phe Glu Glu Pro His Ala Thr Lys Gln Ser Val Ile Ala Leu Gly
530 535 540

Ser Gln Glu Gly Ala Leu His Gln Ala Leu Ala Gly Ala Ile Pro Val
545 550 555 560

Glu Phe Ser Ser Asn Thr Val Lys Leu Thr Ser Gly His Leu Lys Cys
565 570 575

Arg Val Lys Met Glu Lys Leu Gln Leu Lys Gly Thr Thr Tyr Gly Val
580 585 590

Cys Ser Lys Ala Phe Lys Phe Leu Arg Thr Pro Val Asp Thr Gly His
595 600 605

Gly Thr Val Val Leu Glu Leu Gln Tyr Thr Gly Thr Asp Gly Pro Cys
610 615 620

Lys Val Pro Ile Ser Ser Val Ala Ser Leu Asn Asp Leu Thr Pro Val
625 630 635 640

Gly Arg Leu Val Thr Val Asn Pro Phe Val Ser Val Ala Thr Ala Asn
645 650 655

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

Val Val Gly Arg Gly Glu Gln Gln Ile Asn His His Trp His Lys Ser
675 680 685

Gly Ser Ser Ile Gly Lys Ala Phe Thr Thr Thr Leu Lys Gly Ala Gln
690 695 700

Arg Leu Ala Ala Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
705 710 715 720

Gly Val Phe Thr Ser Val Gly Arg Ala Val His Gln Val Phe Gly Gly
725 730 735

Ala Phe Arg Ser Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu
740 745 750

Leu Gly Ala Leu Leu Leu Trp Met Gly Ile Asn Ala Arg Asp Arg Ser

755 760 765

Ile Ala Leu Thr Phe Leu Ala Val Gly Gly Val Leu Leu Phe Leu Ser
770 775 780

Val Asn Val Gly Ala Asp Gln Gly Cys Ala Ile Asn Phe Gly Lys Arg
785 790 795 800

Glu Leu Lys Cys Gly Asp Gly Ile Phe Ile Phe Arg Asp Ser Asp Asp
805 810 815

Trp Leu Asn Lys Tyr Ser Tyr Tyr Pro Glu Asp Pro Val Lys Leu Ala
820 825 830

Ser Ile Val Lys Ala Ser Phe Glu Glu Gly Lys Cys Gly Leu Asn Ser
835 840 845

Val Asp Ser Leu Glu His Glu Met Trp Arg Ser Arg Ala Asp Glu Ile
850 855 860

Asn Ala Ile Phe Glu Glu Asn Glu Val Asp Ile Ser Val Val Val Gln
865 870 875 880

Asp Pro Lys Asn Val Tyr Gln Arg Gly Thr His Pro Phe Ser Arg Ile
885 890 895

Arg Asp Gly Leu Gln Tyr Gly Trp Lys Thr Trp Gly Lys Asn Leu Val
900 905 910

Phe Ser Pro Gly Arg Lys Asn Gly Ser Phe Ile Ile Asp Gly Lys Ser
915 920 925

Arg Lys Glu Cys Pro Phe Ser Asn Arg Val Trp Asn Ser Phe Gln Ile
930 935 940

Glu Glu Phe Gly Thr Gly Val Phe Thr Thr Arg Val Tyr Met Asp Ala
945 950 955 960

Val Phe Glu Tyr Thr Ile Asp Cys Asp Gly Ser Ile Leu Gly Ala Ala
965 970 975

Val Asn Gly Lys Lys Ser Ala His Gly Ser Pro Thr Phe Trp Met Gly
980 985 990

Ser His Glu Val Asn Gly Thr Trp Met Ile His Thr Leu Glu Ala Leu
995 1000 1005

Asp Tyr Lys Glu Cys Glu Trp Pro Leu Thr His Thr Ile Gly Thr
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Ser Val Glu Glu Ser Glu Met Phe Met Pro Arg Ser Ile Gly Gly
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Pro Val Ser Ser His Asn His Ile Pro Gly Tyr Lys Val Gln Thr
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Asn Gly Pro Trp Met Gln Val Pro Leu Glu Val Lys Arg Glu Ala
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Cys Pro Gly Thr Ser Val Ile Ile Asp Gly Asn Cys Asp Gly Arg
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Gly Lys Ser Thr Arg Ser Thr Thr Asp Ser Gly Lys Val Ile Pro
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Glu Trp Cys Cys Arg Ser Cys Thr Met Pro Pro Val Ser Phe His
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Gly Ser Asp Gly Cys Trp Tyr Pro Met Glu Ile Arg Pro Arg Lys
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Thr His Glu Ser His Leu Val Arg Ser Trp Val Thr Ala Gly Glu
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His Glu Met Asn Asn Gly Gly Asp Ala Met Tyr Met Ala Leu Ile
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Arg Thr Leu Trp Ser Pro Arg Glu Arg Leu Val Leu Thr Leu Gly
1235 1240 1245

Ala Ala Met Val Glu Ile Ala Leu Gly Gly Val Met Gly Gly Leu
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Trp Lys Tyr Leu Asn Ala Val Ser Leu Cys Ile Leu Thr Ile Asn
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Ala Val Ala Ser Arg Lys Ala Ser Asn Thr Ile Leu Pro Leu Met
1280 1285 1290

Ala Leu Leu Thr Pro Val Thr Met Ala Glu Val Arg Leu Ala Ala
1295 1300 1305

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1310 1315 1320

Phe Lys Asp Thr Ser Met Gln Lys Thr Ile Pro Leu Val Ala Leu
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Thr Leu Thr Ser Tyr Leu Gly Leu Thr Gln Pro Phe Leu Gly Leu
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Cys Ala Phe Leu Ala Thr Arg Ile Phe Gly Arg Arg Ser Ile Pro
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Asp Gly Leu Glu Leu Lys Lys Leu Gly Glu Val Ser Trp Glu Glu
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Glu Ala Glu Ile Ser Gly Ser Ser Ala Arg Tyr Asp Val Ala Leu
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Ser Glu Gln Gly Glu Phe Lys Leu Leu Ser Glu Glu Lys Val Pro
1445 1450 1455

Trp Asp Gln Val Val Met Thr Ser Leu Ala Leu Val Gly Ala Ala
1460 1465 1470

Leu His Pro Phe Ala Leu Leu Leu Val Leu Ala Gly Trp Leu Phe
1475 1480 1485

His Val Arg Gly Ala Arg Arg Ser Gly Asp Val Leu Trp Asp Ile
1490 1495 1500

Pro Thr Pro Lys Ile Ile Glu Glu Cys Glu His Leu Glu Asp Gly
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Ile Tyr Gly Ile Phe Gln Ser Thr Phe Leu Gly Ala Ser Gln Arg
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Ser Trp Lys Leu Glu Gly Arg Trp Asp Gly Glu Glu Glu Val Gln
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Leu Ile Ala Ala Val Pro Gly Lys Asn Val Val Asn Val Gln Thr
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Lys Pro Ser Leu Phe Lys Val Arg Asn Gly Gly Glu Ile Gly Ala
1610 1615 1620

Val Ala Leu Asp Tyr Pro Ser Gly Thr Ser Gly Ser Pro Ile Val
1625 1630 1635

Asn Arg Asn Gly Glu Val Ile Gly Leu Tyr Gly Asn Gly Ile Leu
1640 1645 1650

Val Gly Asp Asn Ser Phe Val Ser Ala Ile Ser Gln Thr Glu Val

1655 1660 1665

Lys Glu Glu Gly Lys Glu Glu Leu Gln Glu Ile Pro Thr Met Leu
1670 1675 1680

Lys Lys Gly Met Thr Thr Val Leu Asp Phe His Pro Gly Ala Gly
1685 1690 1695

Lys Thr Arg Arg Phe Leu Pro Gln Ile Leu Ala Glu Cys Ala Arg
1700 1705 1710

Arg Arg Leu Arg Thr Leu Val Leu Ala Pro Thr Arg Val Val Leu
1715 1720 1725

Ser Glu Met Lys Glu Ala Phe His Gly Leu Asp Val Lys Phe His
1730 1735 1740

Thr Gln Ala Phe Ser Ala His Gly Ser Gly Arg Glu Val Ile Asp
1745 1750 1755

Ala Met Cys His Ala Thr Leu Thr Tyr Arg Met Leu Glu Pro Thr
1760 1765 1770

Arg Val Val Asn Trp Glu Val Ile Ile Met Asp Glu Ala His Phe
1775 1780 1785

Leu Asp Pro Ala Ser Ile Ala Ala Arg Gly Trp Ala Ala His Arg
1790 1795 1800

Ala Arg Ala Asn Glu Ser Ala Thr Ile Leu Met Thr Ala Thr Pro
1805 1810 1815

Pro Gly Thr Ser Asp Glu Phe Pro His Ser Asn Gly Glu Ile Glu
1820 1825 1830

Asp Val Gln Thr Asp Ile Pro Ser Glu Pro Trp Asn Thr Gly His
1835 1840 1845

Asp Trp Ile Leu Ala Asp Lys Arg Pro Thr Ala Trp Phe Leu Pro
1850 1855 1860

Ser Ile Arg Ala Ala Asn Val Met Ala Ala Ser Leu Arg Lys Ala
1865 1870 1875

Gly Lys Ser Val Val Val Leu Asn Arg Lys Thr Phe Glu Arg Glu
1880 1885 1890

Tyr Pro Thr Ile Lys Gln Lys Lys Pro Asp Phe Ile Leu Ala Thr
1895 1900 1905

Asp Ile Ala Glu Met Gly Ala Asn Leu Cys Val Glu Arg Val Leu
1910 1915 1920

Asp Cys Arg Thr Ala Phe Lys Pro Val Leu Val Asp Glu Gly Arg
1925 1930 1935

Lys Val Ala Ile Lys Gly Pro Leu Arg Ile Ser Ala Ser Ser Ala
1940 1945 1950

Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro Asn Arg Asp Gly
1955 1960 1965

Asp Ser Tyr Tyr Tyr Ser Glu Pro Thr Ser Glu Asn Asn Ala His
1970 1975 1980

His Val Cys Trp Leu Glu Ala Ser Met Leu Leu Asp Asn Met Glu
1985 1990 1995

Val Arg Gly Gly Met Val Ala Pro Leu Tyr Gly Val Glu Gly Thr
2000 2005 2010

Lys Thr Pro Val Ser Pro Gly Glu Met Arg Leu Arg Asp Asp Gln
2015 2020 2025

Arg Lys Val Phe Arg Glu Leu Val Arg Asn Cys Asp Leu Pro Val
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Arg Lys Trp Cys Phe Glu Gly Pro Glu Glu His Glu Ile Leu Asn
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Asp Ser Gly Glu Thr Val Lys Cys Arg Ala Pro Gly Gly Ala Lys
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Lys Pro Leu Arg Pro Arg Trp Cys Asp Glu Arg Val Ser Ser Asp
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Gln Ser Ala Leu Ser Glu Phe Ile Lys Phe Ala Glu Gly Arg Arg
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Gly Ala Ala Glu Val Leu Val Val Leu Ser Glu Leu Pro Asp Phe
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Leu Ala Lys Lys Gly Gly Glu Ala Met Asp Thr Ile Ser Val Phe
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Leu His Ser Glu Glu Gly Ser Arg Ala Tyr Arg Asn Ala Leu Ser
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Met Met Pro Glu Ala Met Thr Ile Val Met Leu Phe Ile Leu Ala
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Gly Leu Leu Thr Ser Gly Met Val Ile Phe Phe Met Ser Pro Lys
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Gly Ile Ser Arg Met Ser Met Ala Met Gly Thr Met Ala Gly Cys
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Gly Tyr Leu Met Phe Leu Gly Gly Val Lys Pro Thr His Ile Ser
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Tyr Val Met Leu Ile Phe Phe Val Leu Met Val Val Val Ile Pro
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Glu Pro Gly Gln Gln Arg Ser Ile Gln Asp Asn Gln Val Ala Tyr
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Leu Ile Ile Gly Ile Leu Thr Leu Val Ser Ala Val Ala Ala Asn
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Glu Leu Gly Met Leu Glu Lys Thr Lys Glu Asp Leu Phe Gly Lys
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Lys Asn Leu Ile Pro Ser Ser Ala Ser Pro Trp Ser Trp Pro Asp
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Leu Asp Leu Lys Pro Gly Ala Ala Trp Thr Val Tyr Val Gly Ile
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Val Thr Met Leu Ser Pro Met Leu His His Trp Ile Lys Val Glu
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Tyr Gly Asn Leu Ser Leu Ser Gly Ile Ala Gln Ser Ala Ser Val
2330 2335 2340

Leu Ser Phe Met Asp Lys Gly Ile Pro Phe Met Lys Met Asn Ile
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Ser Val Ile Met Leu Leu Val Ser Gly Trp Asn Ser Ile Thr Val
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Met Pro Leu Leu Cys Gly Ile Gly Cys Ala Met Leu His Trp Ser
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Leu Ile Leu Pro Gly Ile Lys Ala Gln Gln Ser Lys Leu Ala Gln
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Arg Arg Val Phe His Gly Val Ala Lys Asn Pro Val Val Asp Gly
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Asn Pro Thr Val Asp Ile Glu Glu Ala Pro Glu Met Pro Ala Leu
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Tyr Glu Lys Lys Leu Ala Leu Tyr Leu Leu Leu Ala Leu Ser Leu
2435 2440 2445

Ala Ser Val Ala Met Cys Arg Thr Pro Phe Ser Leu Ala Glu Gly
2450 2455 2460

Ile Val Leu Ala Ser Ala Ala Leu Gly Pro Leu Ile Glu Gly Asn
2465 2470 2475

Thr Ser Leu Leu Trp Asn Gly Pro Met Ala Val Ser Met Thr Gly
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Val Met Arg Gly Asn His Tyr Ala Phe Val Gly Val Met Tyr Asn
2495 2500 2505

Leu Trp Lys Met Lys Thr Gly Arg Arg Gly Ser Ala Asn Gly Lys
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Cys Gly Arg Gly Gly Trp Cys Tyr Tyr Ala Ala Ala Gln Lys Glu
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Val Ser Gly Val Lys Gly Phe Thr Leu Gly Arg Asp Gly His Glu
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Lys Pro Met Asn Val Gln Ser Leu Gly Trp Asn Ile Ile Thr Phe
2630 2635 2640

Lys Asp Lys Thr Asp Ile His Arg Leu Glu Pro Val Lys Cys Asp
2645 2650 2655

Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Ser Ser Ser Val Thr
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Glu Gly Glu Arg Thr Val Arg Val Leu Asp Thr Val Glu Lys Trp
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Leu Ala Cys Gly Val Asp Asn Phe Cys Val Lys Val Leu Ala Pro
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Tyr Met Pro Asp Val Leu Glu Lys Leu Glu Leu Leu Gln Arg Arg
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Phe Gly Gly Thr Val Ile Arg Asn Pro Leu Ser Arg Asn Ser Thr
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His Glu Met Tyr Tyr Val Ser Gly Ala Arg Ser Asn Val Thr Phe
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Pro Thr Gly Lys Val Thr Leu Glu Ala Asp Val Ile Leu Pro Ile
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Ala Ile Glu Glu Arg Val Glu Arg Ile Lys Ser Glu Tyr Met Thr
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Ser Trp Phe Tyr Asp Asn Asp Asn Pro Tyr Arg Thr Trp His Tyr
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His Lys Lys Leu Ala Gln Ala Val Met Glu Met Thr Tyr Lys Asn
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Lys Val Val Lys Val Leu Arg Pro Ala Pro Gly Gly Lys Ala Tyr
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Met Asp Val Ile Ser Arg Arg Asp Gln Arg Gly Ser Gly Gln Val
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Val Thr Tyr Ala Leu Asn Thr Ile Thr Asn Leu Lys Val Gln Leu
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Ile Arg Met Ala Glu Ala Glu Met Val Ile His His Gln His Val
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Thr Glu His Gly Cys Asp Arg Leu Lys Arg Met Ala Val Ser Gly
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Cys Leu Ser Lys Ala Tyr Ala Asn Met Trp Ser Leu Met Tyr Phe
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His Lys Arg Asp Met Arg Leu Leu Ser Leu Ala Val Ser Ser Ala
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atg tct ggt cgt aaa gct cag gga aaa acc ctg ggc gtc aat atg gta 166
Met Ser Gly Arg Lys Ala Gln Gly Lys Thr Leu Gly Val Asn Met Val
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Arg Arg Gly Val Arg Ser Leu Ser Asn Lys Ile Lys Gln Lys Thr Lys
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Gln Ile Gly Asn Arg Pro Gly Pro Ser Arg Gly Val Gln Gly Phe Ile
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Phe Phe Phe Leu Phe Asn Ile Leu Thr Gly Lys Lys Ile Thr Ala His
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Thr Ile Pro Thr Ala Ala Gly Lys Asn Leu Cys Ile Val Arg Ala Met
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Ser Ala Val Tyr Val Arg Tyr Gly Arg Cys Thr Lys Thr Arg His Ser
195 200 205

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Arg Arg Ser Arg Arg Ser Leu Thr Val Gln Thr His Gly Glu Ser Thr
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290 295 300

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305 310 315 320

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

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Val Ser Asp Leu Ser Thr Lys Ala Ala Cys Pro Thr Met Gly Glu Ala
355 360 365

cac aat gac aaa cgt gct gac cca gct ttt gtg tgc aga caa gga gtg 1270
His Asn Asp Lys Arg Ala Asp Pro Ala Phe Val Cys Arg Gln Gly Val
370 375 380

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Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Phe Phe Gly Lys Gly Ser
385 390 395 400

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Ile Asp Thr Cys Ala Lys Phe Ala Cys Ser Thr Lys Ala Ile Gly Arg
405 410 415

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Thr Ile Leu Lys Glu Asn Ile Lys Tyr Glu Val Ala Ile Phe Val His
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Gly Pro Thr Thr Val Glu Ser His Gly Asn Tyr Ser Thr Gln Val Gly
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Ala Thr Gln Ala Gly Arg Phe Ser Ile Thr Pro Ala Ala Pro Ser Tyr
450 455 460

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Thr Leu Lys Leu Gly Glu Tyr Gly Glu Val Thr Val Asp Cys Glu Pro
465 470 475 480

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Arg Ser Gly Ile Asp Thr Asn Ala Tyr Tyr Val Met Thr Val Gly Thr
485 490 495

aag acg ttc ttg gtc cat cgt gag tgg ttc atg gac ctc aac ctc cct 1654
Lys Thr Phe Leu Val His Arg Glu Trp Phe Met Asp Leu Asn Leu Pro
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Glu Phe Glu Glu Pro His Ala Thr Lys Gln Ser Val Ile Ala Leu Gly
530 535 540

tca caa gag gga gct ctg cat caa gct ttg gct gga gcc att cct gtg 1798
Ser Gln Glu Gly Ala Leu His Gln Ala Leu Ala Gly Ala Ile Pro Val
545 550 555 560

gaa ttt tca agc aac act gtc aag ttg acg tcg ggt cat ttg aag tgt 1846
Glu Phe Ser Ser Asn Thr Val Lys Leu Thr Ser Gly His Leu Lys Cys
565 570 575

aga gtg aag atg gaa aaa ttg cag ttg aag gga aca acc tat ggc gtc 1894
Arg Val Lys Met Glu Lys Leu Gln Leu Lys Gly Thr Thr Tyr Gly Val
580 585 590

tgt tca aag gct ttc aag ttt ctt agg act ccc gtg gac acc ggt cac 1942
Cys Ser Lys Ala Phe Lys Phe Leu Arg Thr Pro Val Asp Thr Gly His
595 600 605

ggc act gtg gtg ttg gaa ttg cag tac act ggc acg gat gga cct tgc 1990
Gly Thr Val Val Leu Glu Leu Gln Tyr Thr Gly Thr Asp Gly Pro Cys
610 615 620

aaa gtt cct atc tcg tca gtg gct tca ttg aac gac cta acg cca gtg 2038
Lys Val Pro Ile Ser Ser Val Ala Ser Leu Asn Asp Leu Thr Pro Val
625 630 635 640

ggc aga ttg gtc act gtc aac cct ttt gtt tca gtg gcc acg gcc aac 2086
Gly Arg Leu Val Thr Val Asn Pro Phe Val Ser Val Ala Thr Ala Asn
645 650 655

gct aag gtc ctg att gaa ttg gaa cca ccc ttt gga gac tca tac ata 2134
Ala Lys Val Leu Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile
660 665 670

gtg gtg ggc aga gga gaa caa cag atc aat cac cat tgg cac aag tct 2182
Val Val Gly Arg Gly Glu Gln Gln Ile Asn His His Trp His Lys Ser
675 680 685

gga agc agc att ggc aaa gcc ttt aca acc acc ctc aaa gga gcg cag 2230
Gly Ser Ser Ile Gly Lys Ala Phe Thr Thr Thr Leu Lys Gly Ala Gln
690 695 700

aga cta gcc gct cta gga gac aca gct tgg gac ttt gga tca gtt gga 2278
Arg Leu Ala Ala Leu Gly Asp Thr Ala Trp Asp Phe Gly Ser Val Gly
705 710 715 720

ggg gtg ttc act agt gtt ggg cgg gct gtc cat caa gtg ttc gga gga 2326
Gly Val Phe Thr Ser Val Gly Arg Ala Val His Gln Val Phe Gly Gly
725 730 735

gca ttc cgc tca ctg ttc gga ggc atg tcc tgg ata acg caa gga ttg 2374
Ala Phe Arg Ser Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu
740 745 750

ctg ggg gct ctc ctg ttg tgg atg ggc atc aat gct cgt gat agg tcc 2422
Leu Gly Ala Leu Leu Leu Trp Met Gly Ile Asn Ala Arg Asp Arg Ser
755 760 765

ata gct ctc acg ttt ctc gca gtt gga gga gtt ctg ctc ttc ctc tcc 2470
Ile Ala Leu Thr Phe Leu Ala Val Gly Gly Val Leu Leu Phe Leu Ser
770 775 780

gtg aac gtg ggc gcc gat caa gga tgc gcc atc aac ttt ggc aag aga 2518
Val Asn Val Gly Ala Asp Gln Gly Cys Ala Ile Asn Phe Gly Lys Arg
785 790 795 800

gag ctc aag tgc gga gat ggt atc ttc ata ttt aga gac tct gat gac 2566
Glu Leu Lys Cys Gly Asp Gly Ile Phe Ile Phe Arg Asp Ser Asp Asp
805 810 815

tgg ctg aac aag tac tca tac tat cca gaa gat cct gtg aag ctt gca 2614
Trp Leu Asn Lys Tyr Ser Tyr Tyr Pro Glu Asp Pro Val Lys Leu Ala
820 825 830

tca ata gtg aaa gcc tct ttt gaa gaa ggg aag tgt ggc cta aat tca 2662
Ser Ile Val Lys Ala Ser Phe Glu Glu Gly Lys Cys Gly Leu Asn Ser
835 840 845

gtt gac tcc ctt gag cat gag atg tgg aga agc agg gca gat gag atc 2710
Val Asp Ser Leu Glu His Glu Met Trp Arg Ser Arg Ala Asp Glu Ile

850 855 860

aat gcc att ttt gag gaa aac gag gtg gac att tct gtt gtc gtg cag 2758
Asn Ala Ile Phe Glu Glu Asn Glu Val Asp Ile Ser Val Val Val Gln
865 870 875 880

gat cca aag aat gtt tac cag aga gga act cat cca ttt tcc aga att 2806
Asp Pro Lys Asn Val Tyr Gln Arg Gly Thr His Pro Phe Ser Arg Ile
885 890 895

cgg gat ggt ctg cag tat ggt tgg aag act tgg ggt aag aac ctt gtg 2854
Arg Asp Gly Leu Gln Tyr Gly Trp Lys Thr Trp Gly Lys Asn Leu Val
900 905 910

ttc tcc cca ggg agg aag aat gga agc ttc atc ata gat gga aag tcc 2902
Phe Ser Pro Gly Arg Lys Asn Gly Ser Phe Ile Ile Asp Gly Lys Ser
915 920 925

agg aaa gaa tgc ccg ttt tca aac cgg gtc tgg aat tct ttc cag ata 2950
Arg Lys Glu Cys Pro Phe Ser Asn Arg Val Trp Asn Ser Phe Gln Ile
930 935 940

gag gag ttt ggg acg gga gtg ttc acc aca cgc gtg tac atg gac gca 2998
Glu Glu Phe Gly Thr Gly Val Phe Thr Thr Arg Val Tyr Met Asp Ala
945 950 955 960

gtc ttt gaa tac acc ata gac tgc gat gga tct atc ttg ggt gca gcg 3046
Val Phe Glu Tyr Thr Ile Asp Cys Asp Gly Ser Ile Leu Gly Ala Ala
965 970 975

gtg aac gga aaa aag agt gcc cat ggc tct cca aca ttt tgg atg gga 3094
Val Asn Gly Lys Lys Ser Ala His Gly Ser Pro Thr Phe Trp Met Gly
980 985 990

agt cat gaa gta aat ggg aca tgg atg atc cac acc ttg gag gca tta 3142
Ser His Glu Val Asn Gly Thr Trp Met Ile His Thr Leu Glu Ala Leu
995 1000 1005

gat tac aag gag tgt gag tgg cca ctg aca cat acg att gga aca 3187
Asp Tyr Lys Glu Cys Glu Trp Pro Leu Thr His Thr Ile Gly Thr
1010 1015 1020

tca gtt gaa gag agt gaa atg ttc atg ccg aga tca atc gga ggc 3232
Ser Val Glu Glu Ser Glu Met Phe Met Pro Arg Ser Ile Gly Gly
1025 1030 1035

cca gtt agc tct cac aat cat atc cct gga tac aag gtt cag acg 3277
Pro Val Ser Ser His Asn His Ile Pro Gly Tyr Lys Val Gln Thr
1040 1045 1050

aac gga cct tgg atg cag gta cca cta gaa gtg aag aga gaa gct 3322
Asn Gly Pro Trp Met Gln Val Pro Leu Glu Val Lys Arg Glu Ala
1055 1060 1065

tgc cca ggg act agc gtg atc att gat ggc aac tgt gat gga cgg 3367
Cys Pro Gly Thr Ser Val Ile Ile Asp Gly Asn Cys Asp Gly Arg
1070 1075 1080

gga aaa tca acc aga tcc acc acg gat agc ggg aaa gtt att cct 3412

Gly Lys Ser Thr Arg Ser Thr Thr Asp Ser Gly Lys Val Ile Pro
1085 1090 1095

gaa tgg tgt tgc cgc tcc tgc aca atg ccg cct gtg agc ttc cat 3457
Glu Trp Cys Cys Arg Ser Cys Thr Met Pro Pro Val Ser Phe His
1100 1105 1110

ggt agt gat ggg tgt tgg tat ccc atg gaa att agg cca agg aaa 3502
Gly Ser Asp Gly Cys Trp Tyr Pro Met Glu Ile Arg Pro Arg Lys
1115 1120 1125

acg cat gaa agc cat ctg gtg cgc tcc tgg gtt aca gct gga gaa 3547
Thr His Glu Ser His Leu Val Arg Ser Trp Val Thr Ala Gly Glu
1130 1135 1140

ata cat gct gtc cct ttt ggt ttg gtg agc atg atg ata gca atg 3592
Ile His Ala Val Pro Phe Gly Leu Val Ser Met Met Ile Ala Met
1145 1150 1155

gaa gtg gtc cta agg aaa aga cag gga cca aag caa atg ttg gtt 3637
Glu Val Val Leu Arg Lys Arg Gln Gly Pro Lys Gln Met Leu Val
1160 1165 1170

gga gga gta gtg ctc ttg gga gca atg ctg gtc ggg caa gta act 3682
Gly Gly Val Val Leu Leu Gly Ala Met Leu Val Gly Gln Val Thr
1175 1180 1185

ctc ctt gat ttg ctg aaa ctc aca gtg gct gtg gga ttg cat ttc 3727
Leu Leu Asp Leu Leu Lys Leu Thr Val Ala Val Gly Leu His Phe
1190 1195 1200

cat gag atg aac aat gga gga gac gcc atg tat atg gcg ttg att 3772
His Glu Met Asn Asn Gly Gly Asp Ala Met Tyr Met Ala Leu Ile
1205 1210 1215

gct gcc ttt tca atc aga cca ggg ctg ctc atc ggc ttt ggg ctc 3817
Ala Ala Phe Ser Ile Arg Pro Gly Leu Leu Ile Gly Phe Gly Leu
1220 1225 1230

agg acc cta tgg agc cct cgg gaa cgc ctt gtg ctg acc cta gga 3862
Arg Thr Leu Trp Ser Pro Arg Glu Arg Leu Val Leu Thr Leu Gly
1235 1240 1245

gca gcc atg gtg gag att gcc ttg ggt ggc gtg atg ggc ggc ctg 3907
Ala Ala Met Val Glu Ile Ala Leu Gly Gly Val Met Gly Gly Leu
1250 1255 1260

tgg aag tat cta aat gca gtt tct ctc tgc atc ctg aca ata aat 3952
Trp Lys Tyr Leu Asn Ala Val Ser Leu Cys Ile Leu Thr Ile Asn
1265 1270 1275

gct gtt gct tct agg aaa gca tca aat acc atc ttg ccc ctc atg 3997
Ala Val Ala Ser Arg Lys Ala Ser Asn Thr Ile Leu Pro Leu Met
1280 1285 1290

gct ctg ttg aca cct gtc act atg gct gag gtg aga ctt gcc gca 4042
Ala Leu Leu Thr Pro Val Thr Met Ala Glu Val Arg Leu Ala Ala
1295 1300 1305

atg ttc ttt tgt gcc atg gtt atc ata ggg gtc ctt cac cag aat 4087
Met Phe Phe Cys Ala Met Val Ile Ile Gly Val Leu His Gln Asn
1310 1315 1320

ttc aag gac acc tcc atg cag aag act ata cct ctg gtg gcc ctc 4132
Phe Lys Asp Thr Ser Met Gln Lys Thr Ile Pro Leu Val Ala Leu
1325 1330 1335

aca ctc aca tct tac ctg ggc ttg aca caa cct ttt ttg ggc ctg 4177
Thr Leu Thr Ser Tyr Leu Gly Leu Thr Gln Pro Phe Leu Gly Leu
1340 1345 1350

tgt gca ttt ctg gca acc cgc ata ttt ggg cga agg agt atc cca 4222
Cys Ala Phe Leu Ala Thr Arg Ile Phe Gly Arg Arg Ser Ile Pro
1355 1360 1365

gtg aat gag gca ctc gca gca gct ggt cta gtg gga gtg ctg gca 4267
Val Asn Glu Ala Leu Ala Ala Ala Gly Leu Val Gly Val Leu Ala
1370 1375 1380

gga ctg gct ttt cag gag atg gag aac ttc ctt ggt ccg att gca 4312
Gly Leu Ala Phe Gln Glu Met Glu Asn Phe Leu Gly Pro Ile Ala
1385 1390 1395

gtt gga gga ctc ctg atg atg ctg gtt agc gtg gct ggg agg gtg 4357
Val Gly Gly Leu Leu Met Met Leu Val Ser Val Ala Gly Arg Val
1400 1405 1410

gat ggg cta gag ctc aag aag ctt ggt gaa gtt tca tgg gaa gag 4402
Asp Gly Leu Glu Leu Lys Lys Leu Gly Glu Val Ser Trp Glu Glu
1415 1420 1425

gag gcg gag atc agc ggg agt tcc gcc cgc tat gat gtg gca ctc 4447
Glu Ala Glu Ile Ser Gly Ser Ser Ala Arg Tyr Asp Val Ala Leu
1430 1435 1440

agt gaa caa ggg gag ttc aag ctg ctt tct gaa gag aaa gtg cca 4492
Ser Glu Gln Gly Glu Phe Lys Leu Leu Ser Glu Glu Lys Val Pro
1445 1450 1455

tgg gac cag gtt gtg atg acc tcg ctg gcc ttg gtt ggg gct gcc 4537
Trp Asp Gln Val Val Met Thr Ser Leu Ala Leu Val Gly Ala Ala
1460 1465 1470

ctc cat cca ttt gct ctt ctg ctg gtc ctt gct ggg tgg ctg ttt 4582
Leu His Pro Phe Ala Leu Leu Leu Val Leu Ala Gly Trp Leu Phe
1475 1480 1485

cat gtc agg gga gct agg aga agt ggg gat gtc ttg tgg gat att 4627
His Val Arg Gly Ala Arg Arg Ser Gly Asp Val Leu Trp Asp Ile
1490 1495 1500

ccc act cct aag atc atc gag gaa tgt gaa cat ctg gag gat ggg 4672
Pro Thr Pro Lys Ile Ile Glu Glu Cys Glu His Leu Glu Asp Gly
1505 1510 1515

att tat ggc ata ttc cag tca acc ttc ttg ggg gcc tcc cag cga 4717
Ile Tyr Gly Ile Phe Gln Ser Thr Phe Leu Gly Ala Ser Gln Arg
1520 1525 1530

gga gtg gga gtg gca cag gga ggg gtg ttc cac aca atg tgg cat 4762
Gly Val Gly Val Ala Gln Gly Gly Val Phe His Thr Met Trp His
1535 1540 1545

gtc aca aga gga gct ttc ctt gtc agg aat ggc aag aag ttg att 4807
Val Thr Arg Gly Ala Phe Leu Val Arg Asn Gly Lys Lys Leu Ile
1550 1555 1560

cca tct tgg gct tca gta aag gaa gac ctt gtc gcc tat ggt ggc 4852
Pro Ser Trp Ala Ser Val Lys Glu Asp Leu Val Ala Tyr Gly Gly
1565 1570 1575

tca tgg aag ttg gaa ggc aga tgg gat gga gag gaa gag gtc cag 4897
Ser Trp Lys Leu Glu Gly Arg Trp Asp Gly Glu Glu Glu Val Gln
1580 1585 1590

ttg atc gcg gct gtt cca gga aag aac gtg gtc aac gtc cag aca 4942
Leu Ile Ala Ala Val Pro Gly Lys Asn Val Val Asn Val Gln Thr
1595 1600 1605

aaa ccg agc ttg ttc aaa gtg agg aat ggg gga gaa atc ggg gct 4987
Lys Pro Ser Leu Phe Lys Val Arg Asn Gly Gly Glu Ile Gly Ala
1610 1615 1620

gtc gct ctt gac tat ccg agt ggc act tca gga tct cct att gtt 5032
Val Ala Leu Asp Tyr Pro Ser Gly Thr Ser Gly Ser Pro Ile Val
1625 1630 1635

aac agg aac gga gag gtg att ggg ctg tac ggc aat ggc atc ctt 5077
Asn Arg Asn Gly Glu Val Ile Gly Leu Tyr Gly Asn Gly Ile Leu
1640 1645 1650

gtc ggt gac aac tcc ttc gtg tcc gcc ata tcc cag act gag gtg 5122
Val Gly Asp Asn Ser Phe Val Ser Ala Ile Ser Gln Thr Glu Val
1655 1660 1665

aag gaa gaa gga aag gag gag ctc caa gag atc ccg aca atg cta 5167
Lys Glu Glu Gly Lys Glu Glu Leu Gln Glu Ile Pro Thr Met Leu
1670 1675 1680

aag aaa gga atg aca act gtc ctt gat ttt cat cct gga gct ggg 5212
Lys Lys Gly Met Thr Thr Val Leu Asp Phe His Pro Gly Ala Gly
1685 1690 1695

aag aca aga cgt ttc ctc cca cag atc ttg gcc gag tgc gca cgg 5257
Lys Thr Arg Arg Phe Leu Pro Gln Ile Leu Ala Glu Cys Ala Arg
1700 1705 1710

aga cgc ttg cgc act ctt gtg ttg gcc ccc acc agg gtt gtt ctt 5302
Arg Arg Leu Arg Thr Leu Val Leu Ala Pro Thr Arg Val Val Leu
1715 1720 1725

tct gaa atg aag gag gct ttt cac ggc ctg gac gtg aaa ttc cac 5347
Ser Glu Met Lys Glu Ala Phe His Gly Leu Asp Val Lys Phe His
1730 1735 1740

aca cag gct ttt tcc gct cac ggc agc ggg aga gaa gtc att gat 5392
Thr Gln Ala Phe Ser Ala His Gly Ser Gly Arg Glu Val Ile Asp

1745 1750 1755

gcc atg tgc cat gcc acc cta act tac agg atg ttg gaa cca act 5437
Ala Met Cys His Ala Thr Leu Thr Tyr Arg Met Leu Glu Pro Thr
1760 1765 1770

agg gtt gtt aac tgg gaa gtg atc att atg gat gaa gcc cat ttt 5482
Arg Val Val Asn Trp Glu Val Ile Ile Met Asp Glu Ala His Phe
1775 1780 1785

ttg gat cca gcc agc ata gcc gct aga ggt tgg gca gcg cac aga 5527
Leu Asp Pro Ala Ser Ile Ala Ala Arg Gly Trp Ala Ala His Arg
1790 1795 1800

gct agg gca aat gaa agt gca aca atc ttg atg aca gcc aca ccg 5572
Ala Arg Ala Asn Glu Ser Ala Thr Ile Leu Met Thr Ala Thr Pro
1805 1810 1815

cct ggg act agt gat gaa ttt cca cat tca aat ggt gaa ata gaa 5617
Pro Gly Thr Ser Asp Glu Phe Pro His Ser Asn Gly Glu Ile Glu
1820 1825 1830

gat gtt caa acg gac ata ccc agt gag ccc tgg aac aca ggg cat 5662
Asp Val Gln Thr Asp Ile Pro Ser Glu Pro Trp Asn Thr Gly His
1835 1840 1845

gac tgg atc ctg gct gac aaa agg ccc acg gca tgg ttc ctt cca 5707
Asp Trp Ile Leu Ala Asp Lys Arg Pro Thr Ala Trp Phe Leu Pro
1850 1855 1860

tcc atc aga gct gca aat gtc atg gct gcc tct ttg cgt aag gct 5752
Ser Ile Arg Ala Ala Asn Val Met Ala Ala Ser Leu Arg Lys Ala
1865 1870 1875

gga aag agt gtg gtg gtc ctg aac agg aaa acc ttt gag aga gaa 5797
Gly Lys Ser Val Val Val Leu Asn Arg Lys Thr Phe Glu Arg Glu
1880 1885 1890

tac ccc acg ata aag cag aag aaa cct gac ttt ata ttg gcc act 5842
Tyr Pro Thr Ile Lys Gln Lys Lys Pro Asp Phe Ile Leu Ala Thr
1895 1900 1905

gac ata gct gaa atg gga gcc aac ctt tgc gtg gag cga gtg ctg 5887
Asp Ile Ala Glu Met Gly Ala Asn Leu Cys Val Glu Arg Val Leu
1910 1915 1920

gat tgc agg acg gct ttt aag cct gtg ctt gtg gat gaa ggg agg 5932
Asp Cys Arg Thr Ala Phe Lys Pro Val Leu Val Asp Glu Gly Arg
1925 1930 1935

aag gtg gca ata aaa ggg cca ctt cgt atc tcc gca tcc tct gct 5977
Lys Val Ala Ile Lys Gly Pro Leu Arg Ile Ser Ala Ser Ser Ala
1940 1945 1950

gct caa agg agg ggg cgc att ggg aga aat ccc aac aga gat gga 6022
Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro Asn Arg Asp Gly
1955 1960 1965

gac tca tac tac tat tct gag cct aca agt gaa aat aat gcc cac 6067

Asp Ser Tyr Tyr Tyr Ser Glu Pro Thr Ser Glu Asn Asn Ala His
1970 1975 1980

cac gtc tgc tgg ttg gag gcc tca atg ctc ttg gac aac atg gag 6112
His Val Cys Trp Leu Glu Ala Ser Met Leu Leu Asp Asn Met Glu
1985 1990 1995

gtg agg ggt gga atg gtc gcc cca ctc tat ggc gtt gaa gga act 6157
Val Arg Gly Gly Met Val Ala Pro Leu Tyr Gly Val Glu Gly Thr
2000 2005 2010

aaa aca cca gtt tcc cct ggt gaa atg aga ctg agg gat gac cag 6202
Lys Thr Pro Val Ser Pro Gly Glu Met Arg Leu Arg Asp Asp Gln
2015 2020 2025

agg aaa gtc ttc aga gaa cta gtg agg aat tgt gac ctg ccc gtt 6247
Arg Lys Val Phe Arg Glu Leu Val Arg Asn Cys Asp Leu Pro Val
2030 2035 2040

tgg ctt tcg tgg caa gtg gcc aag gct ggt ttg aag acg aat gat 6292
Trp Leu Ser Trp Gln Val Ala Lys Ala Gly Leu Lys Thr Asn Asp
2045 2050 2055

cgt aag tgg tgt ttt gaa ggc cct gag gaa cat gag atc ttg aat 6337
Arg Lys Trp Cys Phe Glu Gly Pro Glu Glu His Glu Ile Leu Asn
2060 2065 2070

gac agc ggt gaa aca gtg aag tgc agg gct cct gga gga gca aag 6382
Asp Ser Gly Glu Thr Val Lys Cys Arg Ala Pro Gly Gly Ala Lys
2075 2080 2085

aag cct ctg cgc cca agg tgg tgt gat gaa agg gtg tca tct gac 6427
Lys Pro Leu Arg Pro Arg Trp Cys Asp Glu Arg Val Ser Ser Asp
2090 2095 2100

cag agt gcg ctg tct gaa ttt att aag ttt gct gaa ggt agg agg 6472
Gln Ser Ala Leu Ser Glu Phe Ile Lys Phe Ala Glu Gly Arg Arg
2105 2110 2115

gga gct gct gaa gtg cta gtt gtg ctg agt gaa ctc cct gat ttc 6517
Gly Ala Ala Glu Val Leu Val Val Leu Ser Glu Leu Pro Asp Phe
2120 2125 2130

ctg gct aaa aaa ggt gga gag gca atg gat acc atc agt gtg ttc 6562
Leu Ala Lys Lys Gly Gly Glu Ala Met Asp Thr Ile Ser Val Phe
2135 2140 2145

ctc cac tct gag gaa ggc tct agg gct tac cgc aat gca cta tca 6607
Leu His Ser Glu Glu Gly Ser Arg Ala Tyr Arg Asn Ala Leu Ser
2150 2155 2160

atg atg cct gag gca atg aca ata gtc atg ctg ttt ata ctg gct 6652
Met Met Pro Glu Ala Met Thr Ile Val Met Leu Phe Ile Leu Ala
2165 2170 2175

gga cta ctg aca tcg gga atg gtc atc ttt ttc atg tct ccc aaa 6697
Gly Leu Leu Thr Ser Gly Met Val Ile Phe Phe Met Ser Pro Lys
2180 2185 2190

ggc atc agt aga atg tct atg gcg atg ggc aca atg gcc ggc tgt 6742
Gly Ile Ser Arg Met Ser Met Ala Met Gly Thr Met Ala Gly Cys
2195 2200 2205

gga tat ctc atg ttc ctt gga ggc gtc aaa ccc act cac atc tcc 6787
Gly Tyr Leu Met Phe Leu Gly Gly Val Lys Pro Thr His Ile Ser
2210 2215 2220

tat gtc atg ctc ata ttc ttt gtc ctg atg gtg gtt gtg atc ccc 6832
Tyr Val Met Leu Ile Phe Phe Val Leu Met Val Val Val Ile Pro
2225 2230 2235

gag cca ggg caa caa agg tcc atc caa gac aac caa gtg gca tac 6877
Glu Pro Gly Gln Gln Arg Ser Ile Gln Asp Asn Gln Val Ala Tyr
2240 2245 2250

ctc att att ggc atc ctg acg ctg gtt tca gcg gtg gca gcc aac 6922
Leu Ile Ile Gly Ile Leu Thr Leu Val Ser Ala Val Ala Ala Asn
2255 2260 2265

gag cta ggc atg ctg gag aaa acc aaa gag gac ctc ttt ggg aag 6967
Glu Leu Gly Met Leu Glu Lys Thr Lys Glu Asp Leu Phe Gly Lys
2270 2275 2280

aag aac tta att cca tct agt gct tca ccc tgg agt tgg ccg gat 7012
Lys Asn Leu Ile Pro Ser Ser Ala Ser Pro Trp Ser Trp Pro Asp
2285 2290 2295

ctt gac ctg aag cca gga gct gcc tgg aca gtg tac gtt ggc att 7057
Leu Asp Leu Lys Pro Gly Ala Ala Trp Thr Val Tyr Val Gly Ile
2300 2305 2310

gtt aca atg ctc tct cca atg ttg cac cac tgg atc aaa gtc gaa 7102
Val Thr Met Leu Ser Pro Met Leu His His Trp Ile Lys Val Glu
2315 2320 2325

tat ggc aac ctg tct ctg tct gga ata gcc cag tca gcc tca gtc 7147
Tyr Gly Asn Leu Ser Leu Ser Gly Ile Ala Gln Ser Ala Ser Val
2330 2335 2340

ctt tct ttc atg gac aag ggg ata cca ttc atg aag atg aat atc 7192
Leu Ser Phe Met Asp Lys Gly Ile Pro Phe Met Lys Met Asn Ile
2345 2350 2355

tcg gtc ata atg ctg ctg gtc agt ggc tgg aat tca ata aca gtg 7237
Ser Val Ile Met Leu Leu Val Ser Gly Trp Asn Ser Ile Thr Val
2360 2365 2370

atg cct ctg ctc tgt ggc ata ggg tgc gcc atg ctc cac tgg tct 7282
Met Pro Leu Leu Cys Gly Ile Gly Cys Ala Met Leu His Trp Ser
2375 2380 2385

ctc att tta cct gga atc aaa gcg cag cag tca aag ctt gca cag 7327
Leu Ile Leu Pro Gly Ile Lys Ala Gln Gln Ser Lys Leu Ala Gln
2390 2395 2400

aga agg gtg ttc cat ggc gtt gcc aag aac cct gtg gtt gat ggg 7372
Arg Arg Val Phe His Gly Val Ala Lys Asn Pro Val Val Asp Gly
2405 2410 2415

aat cca aca gtt gac att gag gaa gct cct gaa atg cct gcc ctt 7417
Asn Pro Thr Val Asp Ile Glu Glu Ala Pro Glu Met Pro Ala Leu
2420 2425 2430

tat gag aag aaa ctg gct cta tat ctc ctt ctt gct ctc agc cta 7462
Tyr Glu Lys Lys Leu Ala Leu Tyr Leu Leu Leu Ala Leu Ser Leu
2435 2440 2445

gct tct gtt gcc atg tgc aga acg ccc ttt tca ttg gct gaa ggc 7507
Ala Ser Val Ala Met Cys Arg Thr Pro Phe Ser Leu Ala Glu Gly
2450 2455 2460

att gtc cta gca tca gct gcc tta ggg ccg ctc ata gag gga aac 7552
Ile Val Leu Ala Ser Ala Ala Leu Gly Pro Leu Ile Glu Gly Asn
2465 2470 2475

acc agc ctt ctt tgg aat gga ccc atg gct gtc tcc atg aca gga 7597
Thr Ser Leu Leu Trp Asn Gly Pro Met Ala Val Ser Met Thr Gly
2480 2485 2490

gtc atg agg ggg aat cac tat gct ttt gtg gga gtc atg tac aat 7642
Val Met Arg Gly Asn His Tyr Ala Phe Val Gly Val Met Tyr Asn
2495 2500 2505

cta tgg aag atg aaa act gga cgc cgg ggg agc gcg aat gga aaa 7687
Leu Trp Lys Met Lys Thr Gly Arg Arg Gly Ser Ala Asn Gly Lys
2510 2515 2520

act ttg ggt gaa gtc tgg aag agg gaa ctg aat ctg ttg gac aag 7732
Thr Leu Gly Glu Val Trp Lys Arg Glu Leu Asn Leu Leu Asp Lys
2525 2530 2535

cga cag ttt gag ttg tat aaa agg acc gac att gtg gag gtg gat 7777
Arg Gln Phe Glu Leu Tyr Lys Arg Thr Asp Ile Val Glu Val Asp
2540 2545 2550

cgt gat acg gca cgc agg cat ttg gcc gaa ggg aag gtg gac acc 7822
Arg Asp Thr Ala Arg Arg His Leu Ala Glu Gly Lys Val Asp Thr
2555 2560 2565

ggg gtg gcg gtc tcc agg ggg acc gca aag tta agg tgg ttc cat 7867
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2570 2575 2580

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Val Ser Gly Val Lys Gly Phe Thr Leu Gly Arg Asp Gly His Glu
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Lys Asp Lys Thr Asp Ile His Arg Leu Glu Pro Val Lys Cys Asp
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Thr Leu Leu Cys Asp Ile Gly Glu Ser Ser Ser Ser Ser Val Thr
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Tyr Met Pro Asp Val Leu Glu Lys Leu Glu Leu Leu Gln Arg Arg
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Phe Gly Gly Thr Val Ile Arg Asn Pro Leu Ser Arg Asn Ser Thr
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His Glu Met Tyr Tyr Val Ser Gly Ala Arg Ser Asn Val Thr Phe
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<400> 23

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Gln Ile Gly Asn Arg Pro Gly Pro Ser Arg Gly Val Gln Gly Phe Ile
35 40 45

Phe Phe Phe Leu Phe Asn Ile Leu Thr Gly Lys Lys Ile Thr Ala His
50 55 60

Leu Lys Arg Leu Trp Lys Met Leu Asp Pro Arg Gln Gly Leu Ala Val
65 70 75 80

Leu Arg Lys Val Lys Arg Val Val Ala Ser Leu Met Arg Gly Leu Ser
85 90 95

Ser Arg Lys Arg Arg Ser His Asp Val Leu Thr Val Gln Phe Leu Ile
100 105 110

Leu Gly Met Leu Leu Met Thr Gly Gly Val Thr Leu Ser Asn Phe Gln
115 120 125

Gly Lys Val Met Met Thr Val Asn Ala Thr Asp Val Thr Asp Val Ile
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Thr Ile Pro Thr Ala Ala Gly Lys Asn Leu Cys Ile Val Arg Ala Met
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Asp Val Gly Tyr Met Cys Asp Asp Thr Ile Thr Tyr Glu Cys Pro Val
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Leu Ser Ala Gly Asn Asp Pro Glu Asp Ile Asp Cys Trp Cys Thr Lys
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Ser Ala Val Tyr Val Arg Tyr Gly Arg Cys Thr Lys Thr Arg His Ser
195 200 205

Arg Arg Ser Arg Arg Ser Leu Thr Val Gln Thr His Gly Glu Ser Thr
210 215 220

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

Tyr Leu Val Lys Thr Glu Ser Trp Ile Leu Arg Asn Pro Gly Tyr Ala
245 250 255

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275 280 285

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Gly Ala Thr Trp Val Asp Leu Val Leu Glu Gly Asp Ser Cys Val Thr
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Val Ser Asp Leu Ser Thr Lys Ala Ala Cys Pro Thr Met Gly Glu Ala
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His Asn Asp Lys Arg Ala Asp Pro Ala Phe Val Cys Arg Gln Gly Val
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Val Asp Arg Gly Trp Gly Asn Gly Cys Gly Phe Phe Gly Lys Gly Ser
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Ile Asp Thr Cys Ala Lys Phe Ala Cys Ser Thr Lys Ala Ile Gly Arg
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420 425 430

Gly Pro Thr Thr Val Glu Ser His Gly Asn Tyr Ser Thr Gln Val Gly
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450 455 460

Thr Leu Lys Leu Gly Glu Tyr Gly Glu Val Thr Val Asp Cys Glu Pro
465 470 475 480

Arg Ser Gly Ile Asp Thr Asn Ala Tyr Tyr Val Met Thr Val Gly Thr
485 490 495

Lys Thr Phe Leu Val His Arg Glu Trp Phe Met Asp Leu Asn Leu Pro
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515 520 525

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Glu Phe Ser Ser Asn Thr Val Lys Leu Thr Ser Gly His Leu Lys Cys
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Arg Val Lys Met Glu Lys Leu Gln Leu Lys Gly Thr Thr Tyr Gly Val
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Cys Ser Lys Ala Phe Lys Phe Leu Arg Thr Pro Val Asp Thr Gly His
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Gly Arg Leu Val Thr Val Asn Pro Phe Val Ser Val Ala Thr Ala Asn
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Ala Lys Val Leu Ile Glu Leu Glu Pro Pro Phe Gly Asp Ser Tyr Ile
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Gly Val Phe Thr Ser Val Gly Arg Ala Val His Gln Val Phe Gly Gly
725 730 735

Ala Phe Arg Ser Leu Phe Gly Gly Met Ser Trp Ile Thr Gln Gly Leu
740 745 750

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755 760 765

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785 790 795 800

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915 920 925

Arg Lys Glu Cys Pro Phe Ser Asn Arg Val Trp Asn Ser Phe Gln Ile

930 935 940

Glu Glu Phe Gly Thr Gly Val Phe Thr Thr Arg Val Tyr Met Asp Ala
945 950 955 960

Val Phe Glu Tyr Thr Ile Asp Cys Asp Gly Ser Ile Leu Gly Ala Ala
965 970 975

Val Asn Gly Lys Lys Ser Ala His Gly Ser Pro Thr Phe Trp Met Gly
980 985 990

Ser His Glu Val Asn Gly Thr Trp Met Ile His Thr Leu Glu Ala Leu
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His Val Arg Gly Ala Arg Arg Ser Gly Asp Val Leu Trp Asp Ile
1490 1495 1500

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1820 1825 1830

Asp Val Gln Thr Asp Ile Pro Ser Glu Pro Trp Asn Thr Gly His
1835 1840 1845

Asp Trp Ile Leu Ala Asp Lys Arg Pro Thr Ala Trp Phe Leu Pro
1850 1855 1860

Ser Ile Arg Ala Ala Asn Val Met Ala Ala Ser Leu Arg Lys Ala
1865 1870 1875

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1880 1885 1890

Tyr Pro Thr Ile Lys Gln Lys Lys Pro Asp Phe Ile Leu Ala Thr
1895 1900 1905

Asp Ile Ala Glu Met Gly Ala Asn Leu Cys Val Glu Arg Val Leu
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1925 1930 1935

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1940 1945 1950

Ala Gln Arg Arg Gly Arg Ile Gly Arg Asn Pro Asn Arg Asp Gly
1955 1960 1965

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His Val Cys Trp Leu Glu Ala Ser Met Leu Leu Asp Asn Met Glu
1985 1990 1995

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2000 2005 2010

Lys Thr Pro Val Ser Pro Gly Glu Met Arg Leu Arg Asp Asp Gln
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<220>
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<400> 25

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<210> 26
<211> 12
<212> PRT
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<220>
<223> Derived from West Nile virus

<400> 26

Val Val Leu Leu Leu Leu Val Ala Pro Ala Tyr Ser
1 5 10

<210> 27
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<220>
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<400> 27

Val Val Pro Leu Leu Leu Val Ala Pro Ala Tyr Ser
1 5 10

<210> 28
<211> 75
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<213> Artificial Sequence

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<400> 28

Ser Leu Thr Val Gln Thr His Gly Glu Ser Thr Leu Ala Asn Lys Lys
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Gly Ala Trp Met Asp Ser Thr Lys Ala Thr Arg Tyr Leu Val Lys Thr
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Glu Ser Trp Ile Leu Arg Asn Pro Gly Tyr Ala Leu Val Ala Ala Val
35 40 45

Ile Gly Trp Met Leu Gly Ser Asn Thr Met Gln Arg Val Val Phe Val
50 55 60

Val Leu Leu Leu Leu Val Ala Pro Ala Tyr Ser
65 70 75

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<211> 74
<212> PRT
<213> Artificial Sequence

<220>
<223> Derived from West Nile virus

<400> 29

Ser Leu Thr Val Gln Thr His Gly Glu Ser Thr Leu Ala Asn Lys Lys
1 5 10 15

Gly Ala Trp Met Asp Ser Thr Lys Ala Thr Arg Tyr Leu Val Lys Thr
20 25 30

Glu Ser Trp Ile Leu Arg Asn Pro Gly Tyr Ala Leu Val Ala Ala Val
35 40 45

Ile Gly Trp Met Leu Gly Ser Asn Thr Met Gln Arg Val Val Phe Val
50 55 60

Val Leu Leu Leu Val Ala Pro Ala Tyr Ser
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<210> 30
<211> 75
<212> PRT

<213> Artificial Sequence

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<223> Derived from West Nile virus

<400> 30

Ser Leu Thr Val Gln Thr His Gly Glu Ser Thr Leu Ala Asn Lys Lys
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Gly Ala Trp Met Asp Ser Thr Lys Ala Thr Arg Tyr Leu Val Lys Thr
20 25 30

Glu Ser Trp Ile Leu Arg Asn Pro Gly Tyr Ala Leu Val Ala Ala Val
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Ile Gly Trp Met Leu Gly Ser Asn Thr Met Gln Arg Val Val Phe Val
50 55 60

Val Pro Leu Leu Leu Val Ala Pro Ala Tyr Ser
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gcctccgcta ccaccttccc acgtggtggt agaaagacgg ggtctagagg ttagaggaga 240

ccctccaggg aacaaatagt gggaccatat tgacgccagg gaaagaccgg agtggttctc 300

tgcttttcct ccagaggtct gtgagcacag tttgctcaag aataagcaga cctttggatg 360

acaaacacaa aaccact 377

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<211> 343
<212> RNA
<213> Artificial Sequence

<220>
<223> Derived from Yellow Fever virus

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ucccacccca gaguaaaaag aacggagccu ccgcuaccac ccucccacgu ggugguagaa 180

agacgggguc uagagguuag aggagacccu ccagggaaca aauaguggga ccauauugac 240

gccagggaaa gaccggagug guucucugcu uuuccuccag aggucuguga gcacaguuug 300

cucaagaaua agcagaccuu uggaugacaa acacaaaacc acu 343

<210> 33
<211> 338
<212> RNA
<213> Artificial Sequence

<220>
<223> Derived from Yellow Fever virus

<400> 33
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ucccaccgua aaaagaaggg agccucggcu accacccucc cacguggugg uagaaagacg 180

gggucuagag guuagaggag acccuccagg gaacaaauag ugggaccaua uugaggccag 240

ggaaagaccg gagugguucu cugcuuuucc uccagagguc ugugagcaca guuugcucaa 300

gaauaagcag accuuuggau gacaaacaga aaaccacu 338

<210> 34
<211> 116
<212> PRT
<213> Artificial Sequence

<220>
<223> Derived from Tick-borne Encephalitis virus

<400> 34

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Arg Val Ser Lys Glu Thr Ala Thr Lys Thr Arg Gln Pro Arg Val Gln
20 25 30

Met Pro Asn Gly Leu Val Leu Met Arg Met Met Gly Ile Leu Trp His
35 40 45

Ala Val Ala Gly Thr Ala Arg Asn Pro Val Leu Lys Ala Phe Trp Asn

50 55 60

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

Thr Val Ser Ala Leu Met Val Gly Leu Gln Lys Arg Gly Lys Arg Arg
85 90 95

Ser Ala Thr Asp Trp Met Ser Trp Leu Leu Val Ile Thr Leu Leu Gly
100 105 110

Met Thr Leu Ala
115

<210> 35
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Derived from Yellow Fever virus

<400> 35

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

Gln Ile Gly Asn Arg Pro Gly Pro Ser Arg Gly Val Gln Gly Phe Ile
35 40 45

Phe Phe Phe Leu Phe Asn Ile Leu Thr Gly Lys Lys Ile Thr Ala His
50 55 60

Leu Lys Arg Leu Trp Lys Met Leu Asp Pro Arg Gln Gly Leu Ala Val
65 70 75 80

Leu Arg Lys Val Lys Arg Val Val Ala Ser Leu Met Arg Gly Leu Ser
85 90 95

Ser Arg Lys Arg Arg Ser His Asp Val Leu Thr Val Gln Phe Leu Ile
100 105 110

Leu Gly Met Leu Leu Met Thr Gly Gly
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<210> 36
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<400> 36

gtaaatcctg t 11

<210> 37
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<212> DNA
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<220>
<223> Synthetic construct

<400> 37

acaaaaccac aa 12

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<212> DNA
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<223> Derived from Yellow Fever virus and West Nile virus

<400> 38
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tccttgtcaa acaaaataaa acaaaaaaca aaacaaattg gaaacagacc tggaccttca 240

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