SEQUENCE LISTING

<110> Boehringer Ingelheim Vetmedica GmbH

<120> Attenuated pestivirus

<130> P01-2389/WO/1

<160> 12

<170> PatentIn version 3.3

<210> 1
<211> 3898
<212> PRT
<213> CSFV

<400> 1

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Met Glu Leu Asn His Phe Glu Leu Leu Tyr Lys Thr Ser Lys Gln Lys
1               5                  10                  15

Pro Val Gly Val Glu Glu Pro Val Tyr Asp Thr Ala Gly Arg Pro Leu
            20                  25                  30

Phe Gly Asn Pro Ser Glu Val His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Asp Arg Gly Arg Gly Asp Ile Arg Thr Thr Leu Arg Asp Leu Pro
    50                  55                  60

Arg Lys Gly Asp Cys Arg Ser Gly Asn His Leu Gly Pro Val Ser Gly
65                  70                  75                  80

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

Val Tyr His Arg Ala Pro Leu Glu Phe Phe Asp Glu Ala Gln Phe Cys
            100                 105                 110

Glu Val Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Gly Lys Leu
        115                 120                 125

Tyr His Ile Tyr Val Cys Val Asp Gly Cys Ile Leu Leu Lys Leu Ala
    130                 135                 140

Lys Arg Gly Thr Pro Arg Thr Leu Lys Trp Ile Arg Asn Phe Thr Asn
145                 150                 155                 160
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Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Asp Gly Ala Ser Gly Ser
                165                 170                 175

Lys Asp Lys Lys Pro Asp Arg Met Asn Lys Gly Lys Leu Lys Ile Ala
            180                 185                 190

Pro Arg Glu His Glu Lys Asp Ser Lys Thr Lys Pro Pro Asp Ala Thr
        195                 200                 205

Ile Val Val Glu Gly Val Lys Tyr Gln Ile Lys Lys Lys Gly Lys Val
    210                 215                 220

Lys Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys Asn Lys Pro
225                 230                 235                 240

Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala Val
                245                 250                 255

Ile Thr Ile Leu Leu Tyr Gln Pro Val Ala Ala Glu Asn Ile Thr Gln
            260                 265                 270

Trp Asn Leu Ser Asp Asn Gly Thr Asn Gly Ile Gln Arg Ala Met Tyr
        275                 280                 285

Leu Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro Glu Lys Ile
    290                 295                 300

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

Ile Arg Gly Met Met Asp Ala Ser Glu Arg Thr Asn Tyr Thr Cys Cys
                325                 330                 335

Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys Asn Trp Tyr
            340                 345                 350

Asn Ile Asp Pro Trp Ile Gln Leu Met Asn Arg Thr Gln Thr Asn Leu
        355                 360                 365

Thr Glu Gly Pro Pro Asp Lys Glu Cys Ala Val Thr Cys Arg Tyr Asp
    370                 375                 380

Lys Asn Thr Asp Val Asn Val Val Thr Gln Ala Arg Asn Arg Pro Thr
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385 390 395 400

Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe Ala Gly Thr
405 410 415

Val Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp Ile Leu
420 425 430

Tyr Gly Asp His Glu Cys Gly Ser Leu Leu Gln Asp Thr Ala Leu Tyr
435 440 445

Leu Leu Asp Gly Met Thr Asn Thr Ile Glu Asn Ala Arg Gln Gly Ala
450 455 460

Ala Arg Val Thr Ser Trp Leu Gly Arg Gln Leu Ser Thr Ala Gly Lys
465 470 475 480

Lys Leu Glu Arg Arg Ser Lys Thr Trp Phe Gly Ala Tyr Ala Leu Ser
485 490 495

Pro Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Ile Trp Tyr Thr Asn
500 505 510

Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile Gly Pro
515 520 525

Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu Met
530 535 540

Gly Gly His Leu Ser Glu Phe Leu Leu Leu Ser Leu Val Ile Leu Ser
545 550 555 560

Asp Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Ile Leu His Tyr
565 570 575

Ala Ile Pro Gln Ser His Glu Glu Pro Glu Gly Cys Asp Thr Asn Gln
580 585 590

Leu Asn Leu Thr Val Lys Leu Arg Thr Glu Asp Val Val Pro Ser Ser
595 600 605

Val Trp Asn Ile Gly Lys Tyr Val Cys Val Arg Pro Asp Trp Trp Pro
610 615 620

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Tyr Glu Thr Lys Val Ala Leu Leu Phe Glu Glu Ala Gly Gln Val Ile
625                 630                 635                 640

Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Val Trp Asn Ser
                645                 650                 655

Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Ile Lys Val Leu Arg Gly
            660                 665                 670

Gln Val Val Gln Gly Ile Ile Trp Leu Leu Leu Val Thr Gly Ala Gln
        675                 680                 685

Gly Arg Leu Ala Cys Lys Glu Asp Tyr Arg Tyr Ala Ile Ser Ser Thr
    690                 695                 700

Asn Glu Ile Gly Leu Leu Gly Ala Glu Gly Leu Thr Thr Thr Trp Lys
705                 710                 715                 720

Glu Tyr Ser His Gly Leu Gln Leu Asp Asp Gly Thr Val Lys Ala Val
                725                 730                 735

Cys Thr Ala Gly Ser Phe Lys Val Thr Ala Leu Asn Val Val Ser Arg
            740                 745                 750

Arg Tyr Leu Ala Ser Leu His Lys Arg Ala Leu Pro Thr Ser Val Thr
        755                 760                 765

Phe Glu Leu Leu Phe Asp Gly Thr Asn Pro Ala Ile Glu Glu Met Asp
    770                 775                 780

Asp Asp Phe Gly Phe Gly Leu Cys Pro Phe Asp Thr Ser Pro Val Ile
785                 790                 795                 800

Lys Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Tyr Leu
                805                 810                 815

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

Pro Thr Thr Leu Arg Thr Glu Val Val Lys Thr Phe Arg Arg Asp Lys
        835                 840                 845

Pro Phe Pro His Arg Val Asp Cys Val Thr Thr Ile Val Glu Lys Glu
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    850                 855                 860

Asp Leu Phe His Cys Lys Leu Gly Gly Asn Trp Thr Cys Val Lys Gly
865                 870                 875                 880

Asp Pro Val Thr Tyr Lys Gly Gly Gln Val Lys Gln Cys Arg Trp Cys
                885                 890                 895

Gly Phe Glu Phe Lys Glu Pro Tyr Gly Leu Pro His Tyr Pro Ile Gly
            900                 905                 910

Lys Cys Ile Leu Thr Asn Glu Thr Gly Tyr Arg Val Val Asp Ser Thr
        915                 920                 925

Asp Cys Asn Arg Asp Gly Val Val Ile Ser Thr Glu Gly Glu His Glu
    930                 935                 940

Cys Leu Ile Gly Asn Thr Thr Val Lys Val His Ala Leu Asp Glu Arg
945                 950                 955                 960

Leu Gly Pro Met Pro Cys Arg Pro Lys Glu Ile Val Ser Ser Glu Gly
                965                 970                 975

Pro Val Arg Lys Thr Ser Cys Thr Phe Asn Tyr Thr Lys Thr Leu Arg
            980                 985                 990

Asn Lys Tyr Tyr Glu Pro Arg Asp  Ser Tyr Phe Gln Gln  Tyr Met Leu
        995                 1000                1005

Lys Gly  Glu Tyr Gln Tyr Trp  Phe Asn Leu Asp Val  Thr Asp His
    1010                1015                1020

His Thr  Asp Tyr Phe Ala Glu  Phe Val Val Leu Val  Val Val Ala
    1025                1030                1035

Leu Leu  Gly Gly Arg Tyr Val  Leu Trp Leu Ile Val  Thr Tyr Ile
    1040                1045                1050

Ile Leu  Thr Glu Gln Leu Ala  Ala Gly Leu Gln Leu  Gly Gln Gly
    1055                1060                1065

Glu Val  Val Leu Ile Gly Asn  Leu Ile Thr His Thr  Asp Asn Glu
    1070                1075                1080
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Val Val  Val Tyr Phe Leu Leu  Leu Tyr Leu Val Ile  Arg Asp Glu
    1085                 1090                 1095

Pro Ile  Lys Lys Trp Ile Leu  Leu Leu Phe His Ala  Met Thr Asn
    1100                 1105                 1110

Asn Pro  Val Lys Thr Ile Thr  Val Ala Leu Leu Met  Ile Ser Gly
    1115                 1120                 1125

Val Ala  Lys Gly Gly Lys Ile  Asp Gly Gly Trp Gln  Arg Gln Pro
    1130                 1135                 1140

Val Thr  Ser Phe Asp Ile Gln  Leu Ala Leu Ala Val  Val Val Val
    1145                 1150                 1155

Val Val  Met Leu Leu Ala Lys  Arg Asp Pro Thr Thr  Phe Pro Leu
    1160                 1165                 1170

Val Ile  Thr Val Ala Thr Leu  Arg Thr Ala Lys Ile  Thr Asn Gly
    1175                 1180                 1185

Phe Ser  Thr Asp Leu Val Ile  Ala Thr Val Ser Ala  Ala Leu Leu
    1190                 1195                 1200

Thr Trp  Thr Tyr Ile Ser Asp  Tyr Tyr Lys Tyr Lys  Thr Trp Leu
    1205                 1210                 1215

Gln Tyr  Leu Val Ser Thr Val  Thr Gly Ile Phe Leu  Ile Arg Val
    1220                 1225                 1230

Leu Lys  Gly Ile Gly Glu Leu  Asp Leu His Ala Pro  Thr Leu Pro
    1235                 1240                 1245

Ser His  Arg Pro Leu Phe Tyr  Ile Leu Val Tyr Leu  Ile Ser Thr
    1250                 1255                 1260

Ala Val  Val Thr Arg Trp Asn  Leu Asp Val Ala Gly  Leu Leu Leu
    1265                 1270                 1275

Gln Cys  Val Pro Thr Leu Leu  Met Val Phe Thr Met  Trp Ala Asp
    1280                 1285                 1290

Ile Leu  Thr Leu Ile Leu Ile  Leu Pro Thr Tyr Glu  Leu Thr Lys
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    1295                1300                1305

Leu Tyr  Tyr Leu Lys Glu Val  Lys Ile Gly Ala Glu  Arg Gly Trp
    1310                1315                1320

Leu Trp  Lys Thr Asn Tyr Lys  Arg Val Asn Asp Ile  Tyr Glu Val
    1325                1330                1335

Asp Gln  Thr Ser Glu Gly Val  Tyr Leu Phe Pro Ser  Lys Gln Arg
    1340                1345                1350

Thr Ser  Ala Ile Thr Ser Thr  Met Leu Pro Leu Ile  Lys Ala Ile
    1355                1360                1365

Leu Ile  Ser Cys Ile Ser Asn  Lys Trp Gln Leu Ile  Tyr Leu Leu
    1370                1375                1380

Tyr Leu  Ile Phe Glu Val Ser  Tyr Tyr Leu His Lys  Lys Val Ile
    1385                1390                1395

Asp Glu  Ile Ala Gly Gly Thr  Asn Phe Val Ser Arg  Leu Val Ala
    1400                1405                1410

Ala Leu  Ile Glu Val Asn Trp  Ala Phe Asp Asn Glu  Glu Val Lys
    1415                1420                1425

Gly Leu  Lys Lys Phe Phe Leu  Leu Ser Ser Arg Val  Lys Glu Leu
    1430                1435                1440

Ile Ile  Lys His Lys Val Arg  Asn Glu Val Val Val  Arg Trp Phe
    1445                1450                1455

Gly Asp  Glu Glu Ile Tyr Gly  Met Pro Lys Leu Ile  Gly Leu Val
    1460                1465                1470

Lys Ala  Ala Thr Leu Ser Arg  Asn Lys His Cys Met  Leu Cys Thr
    1475                1480                1485

Val Cys  Glu Asp Arg Asp Trp  Arg Gly Glu Thr Cys  Pro Lys Cys
    1490                1495                1500

Gly Arg  Phe Gly Pro Pro Val  Val Cys Gly Met Thr  Leu Ala Asp
    1505                1510                1515
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Phe Glu  Glu Lys His Tyr Lys  Arg Ile Phe Ile Arg  Glu Asp Gln
    1520                 1525                 1530

Ser Gly  Gly Pro Leu Arg Glu  Glu His Ala Gly Tyr  Leu Gln Tyr
    1535                 1540                 1545

Lys Ala  Arg Gly Gln Leu Phe  Leu Arg Asn Leu Pro  Val Leu Ala
    1550                 1555                 1560

Thr Lys  Val Lys Met Leu Leu  Val Gly Asn Leu Gly  Thr Glu Ile
    1565                 1570                 1575

Gly Asp  Leu Glu His Leu Gly  Trp Val Leu Arg Gly  Pro Ala Val
    1580                 1585                 1590

Cys Lys  Lys Val Thr Glu His  Glu Arg Cys Thr Thr  Ser Ile Met
    1595                 1600                 1605

Asp Lys  Leu Thr Ala Phe Phe  Gly Val Met Pro Arg  Gly Thr Thr
    1610                 1615                 1620

Pro Arg  Ala Pro Val Arg Phe  Pro Thr Ser Leu Leu  Lys Ile Arg
    1625                 1630                 1635

Arg Gly  Leu Glu Thr Gly Trp  Ala Tyr Thr His Gln  Gly Gly Ile
    1640                 1645                 1650

Ser Ser  Val Asp His Val Thr  Cys Gly Lys Asp Leu  Leu Val Cys
    1655                 1660                 1665

Asp Thr  Met Gly Arg Thr Arg  Val Val Cys Gln Ser  Asn Asn Lys
    1670                 1675                 1680

Met Thr  Asp Glu Ser Glu Tyr  Gly Val Lys Thr Asp  Ser Gly Cys
    1685                 1690                 1695

Pro Glu  Gly Ala Arg Cys Tyr  Val Phe Asn Pro Glu  Ala Val Asn
    1700                 1705                 1710

Ile Ser  Gly Thr Lys Gly Ala  Met Val His Leu Gln  Lys Thr Gly
    1715                 1720                 1725

Gly Glu  Phe Thr Cys Val Thr  Ala Ser Gly Thr Pro  Ala Phe Phe
```

1730 1735 1740

Asp Leu Lys Asn Leu Lys Gly Trp Ser Gly Leu Pro Ile Phe Glu
1745 1750 1755

Ala Ser Ser Gly Arg Val Val Gly Arg Val Lys Val Gly Lys Asn
1760 1765 1770

Glu Asp Ser Lys Pro Thr Lys Leu Met Ser Gly Ile Gln Thr Val
1775 1780 1785

Ser Lys Ser Ala Thr Asp Leu Thr Glu Met Val Lys Lys Ile Thr
1790 1795 1800

Thr Met Asn Arg Gly Glu Phe Arg Gln Ile Thr Leu Ala Thr Gly
1805 1810 1815

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

Gly Arg His Lys Arg Val Leu Val Leu Ile Pro Leu Arg Ala Ala
1835 1840 1845

Ala Glu Ser Val Tyr Gln Tyr Met Arg Gln Lys His Pro Ser Ile
1850 1855 1860

Ala Phe Asn Leu Arg Ile Gly Glu Met Lys Glu Gly Asp Met Ala
1865 1870 1875

Thr Gly Ile Thr Tyr Ala Ser Tyr Gly Tyr Phe Cys Gln Met Ser
1880 1885 1890

Gln Pro Lys Leu Arg Ala Ala Met Val Glu Tyr Ser Phe Ile Phe
1895 1900 1905

Leu Asp Glu Tyr His Cys Ala Thr Pro Glu Gln Leu Ala Ile Met
1910 1915 1920

Gly Lys Ile His Arg Phe Ser Glu Asn Leu Arg Val Val Ala Met
1925 1930 1935

Thr Ala Thr Pro Ala Gly Thr Val Thr Thr Thr Gly Gln Lys His
1940 1945 1950

```
Pro Ile  Glu Glu Phe Ile Ala  Pro Glu Val Met Lys  Gly Glu Asp
    1955                 1960                 1965

Leu Gly  Ser Glu Tyr Leu Asp  Ile Ala Gly Leu Lys  Ile Pro Val
    1970                 1975                 1980

Glu Glu  Met Lys Asn Asn Met  Leu Val Phe Val Pro  Thr Arg Asn
    1985                 1990                 1995

Met Ala  Val Glu Ala Ala Lys  Lys Leu Lys Ala Lys  Gly Tyr Asn
    2000                 2005                 2010

Ser Gly  Tyr Tyr Tyr Ser Gly  Glu Asp Pro Ser Asn  Leu Arg Val
    2015                 2020                 2025

Val Thr  Ser Gln Ser Pro Tyr  Val Val Val Ala Thr  Asn Ala Ile
    2030                 2035                 2040

Glu Ser  Gly Val Thr Leu Pro  Asp Leu Asp Val Val  Val Asp Thr
    2045                 2050                 2055

Gly Leu  Lys Cys Glu Lys Arg  Ile Arg Leu Ser Pro  Lys Met Pro
    2060                 2065                 2070

Phe Ile  Val Thr Gly Leu Lys  Arg Met Ala Val Thr  Ile Gly Glu
    2075                 2080                 2085

Gln Ala  Gln Arg Arg Gly Arg  Val Gly Arg Val Lys  Pro Gly Arg
    2090                 2095                 2100

Tyr Tyr  Arg Ser Gln Glu Thr  Pro Val Gly Ser Lys  Asp Tyr His
    2105                 2110                 2115

Tyr Asp  Leu Leu Gln Ala Gln  Arg Tyr Gly Ile Glu  Asp Gly Ile
    2120                 2125                 2130

Asn Ile  Thr Lys Ser Phe Arg  Glu Met Asn Tyr Asp  Trp Ser Leu
    2135                 2140                 2145

Tyr Glu  Glu Asp Ser Leu Met  Ile Thr Gln Leu Glu  Ile Leu Asn
    2150                 2155                 2160

Asn Leu  Leu Ile Ser Glu Glu  Leu Pro Met Ala Val  Lys Asn Ile
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2165 2170 2175

Met Ala Arg Thr Asp His Pro Glu Pro Ile Gln Leu Ala Tyr Asn
2180 2185 2190

Ser Tyr Glu Thr Gln Val Pro Val Leu Phe Pro Lys Ile Arg Asn
2195 2200 2205

Gly Glu Val Thr Asp Thr Tyr Asp Asn Tyr Thr Phe Leu Asn Ala
2210 2215 2220

Arg Lys Leu Gly Asp Asp Val Pro Pro Tyr Val Tyr Ala Thr Glu
2225 2230 2235

Asp Glu Asp Leu Ala Val Glu Leu Leu Gly Leu Asp Trp Pro Asp
2240 2245 2250

Pro Gly Asn Gln Gly Thr Val Glu Ala Gly Arg Ala Leu Lys Gln
2255 2260 2265

Val Val Gly Leu Ser Thr Ala Glu Asn Ala Leu Leu Val Ala Leu
2270 2275 2280

Phe Gly Tyr Val Gly Tyr Gln Ala Leu Ser Lys Arg His Ile Pro
2285 2290 2295

Val Val Thr Asp Ile Tyr Ser Val Glu Asp His Arg Leu Glu Asp
2300 2305 2310

Thr Thr His Leu Gln Tyr Ala Pro Asn Ala Ile Lys Thr Glu Gly
2315 2320 2325

Lys Glu Thr Glu Leu Lys Glu Leu Ala Gln Gly Asp Val Gln Arg
2330 2335 2340

Cys Val Glu Ala Val Thr Asn Tyr Ala Arg Glu Gly Ile Gln Phe
2345 2350 2355

Met Lys Ser Gln Ala Leu Lys Val Arg Glu Thr Pro Thr Tyr Lys
2360 2365 2370

Glu Thr Met Asn Thr Val Ala Asp Tyr Val Lys Lys Phe Ile Glu
2375 2380 2385

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Ala Leu  Thr Asp Ser Lys Glu  Asp Ile Ile Lys Tyr  Gly Leu Trp
    2390                 2395                 2400

Gly Ala  His Thr Ala Leu Tyr  Lys Ser Ile Gly Ala  Arg Leu Gly
    2405                 2410                 2415

His Glu  Thr Ala Phe Ala Thr  Leu Val Val Lys Trp  Leu Ala Phe
    2420                 2425                 2430

Gly Gly  Glu Ser Ile Ser Asp  His Ile Lys Gln Ala  Ala Thr Asp
    2435                 2440                 2445

Leu Val  Val Tyr Tyr Ile Ile  Asn Arg Pro Gln Phe  Pro Gly Asp
    2450                 2455                 2460

Thr Glu  Thr Gln Gln Glu Gly  Arg Lys Phe Val Ala  Ser Leu Leu
    2465                 2470                 2475

Val Ser  Ala Leu Ala Thr Tyr  Thr Tyr Lys Ser Trp  Asn Tyr Asn
    2480                 2485                 2490

Asn Leu  Ser Lys Ile Val Glu  Pro Ala Leu Ala Thr  Leu Pro Tyr
    2495                 2500                 2505

Ala Ala  Lys Ala Leu Lys Leu  Phe Ala Pro Thr Arg  Leu Glu Ser
    2510                 2515                 2520

Val Val  Ile Leu Ser Thr Ala  Ile Tyr Lys Thr Tyr  Leu Ser Ile
    2525                 2530                 2535

Arg Arg  Gly Lys Ser Asp Gly  Leu Leu Gly Thr Gly  Val Ser Ala
    2540                 2545                 2550

Ala Met  Glu Ile Met Ser Gln  Asn Pro Val Ser Val  Gly Ile Ala
    2555                 2560                 2565

Val Met  Leu Gly Val Gly Ala  Val Ala Ala His Asn  Ala Ile Glu
    2570                 2575                 2580

Ala Ser  Glu Gln Lys Arg Thr  Leu Leu Met Lys Val  Phe Val Lys
    2585                 2590                 2595

Asn Phe  Leu Asp Gln Ala Ala  Thr Asp Glu Leu Val  Lys Glu Ser
```

2600 2605 2610

Pro Glu Lys Ile Ile Met Ala Leu Phe Glu Ala Val Gln Thr Val
2615 2620 2625

Gly Asn Pro Leu Arg Leu Val Tyr His Leu Tyr Gly Val Phe Tyr
2630 2635 2640

Lys Gly Trp Glu Ala Lys Glu Leu Ala Gln Arg Thr Ala Gly Arg
2645 2650 2655

Asn Leu Phe Thr Leu Ile Met Phe Glu Ala Val Glu Leu Leu Gly
2660 2665 2670

Val Asp Ser Glu Gly Lys Ile Arg Gln Leu Ser Ser Asn Tyr Ile
2675 2680 2685

Leu Glu Leu Leu Tyr Lys Phe Arg Asp Asn Ile Lys Ser Ser Val
2690 2695 2700

Arg Glu Ile Ala Ile Ser Trp Ala Pro Ala Pro Phe Ser Cys Asp
2705 2710 2715

Trp Thr Pro Thr Asp Asp Arg Ile Gly Leu Pro His Asp Asn Tyr
2720 2725 2730

Leu Arg Val Glu Thr Lys Cys Pro Cys Gly Tyr Arg Met Lys Ala
2735 2740 2745

Val Lys Asn Cys Ala Gly Glu Leu Arg Leu Leu Glu Glu Gly Gly
2750 2755 2760

Ser Phe Leu Cys Arg Asn Lys Phe Gly Arg Gly Ser Gln Asn Tyr
2765 2770 2775

Arg Val Thr Lys Tyr Tyr Asp Asp Asn Leu Ser Glu Ile Lys Pro
2780 2785 2790

Val Ile Arg Met Glu Gly His Val Glu Leu Tyr Tyr Lys Gly Ala
2795 2800 2805

Thr Ile Lys Leu Asp Phe Asn Asn Ser Lys Thr Val Leu Ala Thr
2810 2815 2820

```
Asp Lys  Trp Glu Val Asp His  Ser Thr Leu Val Arg  Ala Leu Lys
    2825                 2830                 2835

Arg Tyr  Thr Gly Ala Gly Tyr  Arg Gly Ala Tyr Leu  Gly Glu Lys
    2840                 2845                 2850

Pro Asn  His Lys His Leu Ile  Gln Arg Asp Cys Ala  Thr Leu Thr
    2855                 2860                 2865

Lys Asp  Lys Val Cys Phe Ile  Lys Met Lys Arg Gly  Cys Ala Phe
    2870                 2875                 2880

Thr Tyr  Asp Leu Ser Leu His  Asn Leu Thr Arg Leu  Ile Glu Leu
    2885                 2890                 2895

Val His  Lys Asn Asn Leu Glu  Asp Arg Glu Ile Pro  Ala Val Thr
    2900                 2905                 2910

Val Thr  Thr Trp Leu Ala Tyr  Thr Phe Val Asn Glu  Asp Ile Gly
    2915                 2920                 2925

Thr Ile  Lys Pro Thr Phe Gly  Glu Lys Val Thr Pro  Glu Lys Gln
    2930                 2935                 2940

Glu Glu  Val Val Leu Gln Pro  Ala Val Val Val Asp  Thr Thr Asp
    2945                 2950                 2955

Val Ala  Val Thr Val Val Gly  Glu Thr Ser Thr Met  Thr Thr Gly
    2960                 2965                 2970

Glu Thr  Pro Thr Thr Phe Thr  Ser Leu Gly Ser Asp  Ser Lys Val
    2975                 2980                 2985

Arg Gln  Val Leu Lys Leu Gly  Val Asp Asp Gly Gln  Tyr Pro Gly
    2990                 2995                 3000

Pro Asn  Gln Gln Arg Ala Ser  Leu Leu Glu Ala Ile  Gln Gly Val
    3005                 3010                 3015

Asp Glu  Arg Pro Ser Val Leu  Ile Leu Gly Ser Asp  Lys Ala Thr
    3020                 3025                 3030

Ser Asn  Arg Val Lys Thr Ala  Lys Asn Val Lys Ile  Tyr Arg Ser
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3035 3040 3045

Arg Asp Pro Leu Glu Leu Arg Glu Met Met Lys Arg Gly Lys Ile
3050 3055 3060

Leu Val Val Ala Leu Ser Arg Val Asp Thr Ala Leu Leu Lys Phe
3065 3070 3075

Val Asp Tyr Lys Gly Thr Phe Leu Thr Arg Glu Thr Leu Glu Ala
3080 3085 3090

Leu Ser Leu Gly Lys Pro Lys Lys Arg Asp Ile Thr Lys Ala Glu
3095 3100 3105

Ala Gln Trp Leu Leu Arg Leu Glu Asp Gln Ile Glu Glu Leu Pro
3110 3115 3120

Asp Trp Phe Ala Ala Lys Glu Pro Ile Phe Leu Glu Ala Asn Ile
3125 3130 3135

Lys Arg Asp Lys Tyr His Leu Val Gly Asp Ile Ala Thr Ile Lys
3140 3145 3150

Glu Lys Ala Lys Gln Leu Gly Ala Thr Asp Ser Thr Lys Ile Ser
3155 3160 3165

Lys Glu Val Gly Ala Lys Val Tyr Ser Met Lys Leu Ser Asn Trp
3170 3175 3180

Val Ile Gln Glu Glu Asn Lys Gln Gly Ser Leu Ala Pro Leu Phe
3185 3190 3195

Glu Glu Leu Leu Gln Gln Cys Pro Pro Gly Gly Gln Asn Lys Thr
3200 3205 3210

Thr His Met Val Ser Ala Tyr Gln Leu Ala Gln Gly Asn Trp Val
3215 3220 3225

Pro Val Ser Cys His Val Phe Met Gly Thr Ile Pro Ala Arg Arg
3230 3235 3240

Thr Lys Thr His Pro Tyr Glu Ala Tyr Val Lys Leu Arg Glu Leu
3245 3250 3255

Val Asp Glu His Lys Met Lys Ala Leu Cys Gly Gly Ser Gly Leu
3260 3265 3270

Ser Lys His Asn Glu Trp Val Ile Gly Lys Val Lys Tyr Gln Gly
3275 3280 3285

Asn Leu Arg Thr Lys His Met Leu Asn Pro Gly Lys Val Ala Glu
3290 3295 3300

Gln Leu His Arg Glu Gly Tyr Arg His Asn Val Tyr Asn Lys Thr
3305 3310 3315

Ile Gly Ser Val Met Thr Ala Thr Gly Ile Arg Leu Glu Lys Leu
3320 3325 3330

Pro Val Val Arg Ala Gln Thr Asp Thr Thr Asn Phe His Gln Ala
3335 3340 3345

Ile Arg Asp Lys Ile Asp Lys Glu Glu Asn Leu Gln Thr Pro Gly
3350 3355 3360

Leu His Lys Lys Leu Met Glu Val Phe Asn Ala Leu Lys Arg Pro
3365 3370 3375

Glu Leu Glu Ala Ser Tyr Asp Ala Val Asp Trp Glu Glu Leu Glu
3380 3385 3390

Arg Gly Ile Asn Arg Lys Gly Ala Ala Gly Phe Phe Glu Arg Lys
3395 3400 3405

Asn Ile Gly Glu Val Leu Asp Ser Glu Lys Asn Lys Val Glu Glu
3410 3415 3420

Val Ile Asp Ser Leu Lys Lys Gly Arg Asn Ile Arg Tyr Tyr Glu
3425 3430 3435

Thr Ala Ile Pro Lys Asn Glu Lys Arg Asp Val Asn Asp Asp Trp
3440 3445 3450

Thr Ala Gly Asp Phe Val Asp Glu Lys Lys Pro Arg Val Ile Gln
3455 3460 3465

Tyr Pro Glu Ala Lys Thr Arg Leu Ala Ile Thr Lys Val Met Tyr

3470 3475 3480

Lys Trp Val Lys Gln Lys Pro Val Val Ile Pro Gly Tyr Glu Gly
3485 3490 3495

Lys Thr Pro Leu Phe Gln Ile Phe Asp Lys Val Lys Lys Glu Trp
3500 3505 3510

Asp Gln Phe Gln Asn Pro Val Ala Val Ser Phe Asp Thr Lys Ala
3515 3520 3525

Trp Asp Thr Gln Val Thr Thr Arg Asp Leu Glu Leu Ile Arg Asp
3530 3535 3540

Ile Gln Lys Phe Tyr Phe Lys Lys Lys Trp His Lys Phe Ile Asp
3545 3550 3555

Thr Leu Thr Lys His Met Ser Glu Val Pro Val Ile Ser Ala Asp
3560 3565 3570

Gly Glu Val Tyr Ile Arg Lys Gly Gln Arg Gly Ser Gly Gln Pro
3575 3580 3585

Asp Thr Ser Ala Gly Asn Ser Met Leu Asn Val Leu Thr Met Val
3590 3595 3600

Tyr Ala Phe Cys Glu Ala Thr Gly Val Pro Tyr Lys Ser Phe Asp
3605 3610 3615

Arg Val Ala Lys Ile His Val Cys Gly Asp Asp Gly Phe Leu Ile
3620 3625 3630

Thr Glu Arg Ala Leu Gly Glu Lys Phe Ala Ser Lys Gly Val Gln
3635 3640 3645

Ile Leu Tyr Glu Ala Gly Lys Pro Gln Lys Ile Thr Glu Gly Asp
3650 3655 3660

Lys Met Lys Val Ala Tyr Gln Phe Asp Asp Ile Glu Phe Cys Ser
3665 3670 3675

His Thr Pro Val Gln Val Arg Trp Ser Asp Asn Thr Ser Ser Tyr
3680 3685 3690

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Met Pro  Gly Arg Asn Thr Thr  Thr Ile Leu Ala Lys  Met Ala Thr
    3695                 3700                 3705

Arg Leu  Asp Ser Ser Gly Glu  Arg Gly Thr Ile Ala  Tyr Glu Lys
    3710                 3715                 3720

Ala Val  Ala Phe Ser Phe Leu  Leu Met Tyr Ser Trp  Asn Pro Leu
    3725                 3730                 3735

Ile Arg  Arg Ile Cys Leu Leu  Val Leu Ser Thr Glu  Leu Gln Val
    3740                 3745                 3750

Arg Pro  Gly Lys Ser Thr Thr  Tyr Tyr Tyr Glu Gly  Asp Pro Ile
    3755                 3760                 3765

Ser Ala  Tyr Lys Glu Val Ile  Gly His Asn Leu Phe  Asp Leu Lys
    3770                 3775                 3780

Arg Thr  Ser Phe Glu Lys Leu  Ala Lys Leu Asn Leu  Ser Met Ser
    3785                 3790                 3795

Thr Leu  Gly Val Trp Thr Arg  His Thr Ser Lys Arg  Leu Leu Gln
    3800                 3805                 3810

Asp Cys  Val Asn Val Gly Thr  Lys Glu Gly Asn Trp  Leu Val Asn
    3815                 3820                 3825

Ala Asp  Arg Leu Val Ser Ser  Lys Thr Gly Asn Arg  Tyr Ile Pro
    3830                 3835                 3840

Gly Glu  Gly His Thr Leu Gln  Gly Lys His Tyr Glu  Glu Leu Ile
    3845                 3850                 3855

Leu Ala  Arg Lys Pro Ile Gly  Asn Phe Glu Gly Thr  Asp Arg Tyr
    3860                 3865                 3870

Asn Leu  Gly Pro Ile Val Asn  Val Val Leu Arg Arg  Leu Lys Ile
    3875                 3880                 3885

Met Met  Met Ala Leu Ile Gly  Arg Gly Val
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Pro Val Gly Val Glu Glu Pro Val Tyr Asp Thr Ala Gly Arg Pro Leu
20 25 30

Phe Gly Asn Pro Ser Glu Val His Pro Gln Ser Thr Leu Lys Leu Pro
35 40 45

His Asp Arg Gly Arg Gly Asp Ile Arg Thr Thr Leu Arg Asp Leu Pro
50 55 60

Arg Lys Gly Asp Cys Arg Ser Gly Asn His Leu Gly Pro Val Ser Gly
65 70 75 80

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

Val Tyr His Arg Ala Pro Leu Glu Phe Phe Asp Glu Ala Gln Phe Cys
100 105 110

Glu Val Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Gly Lys Leu
115 120 125

Tyr His Ile Tyr Val Cys Val Asp Gly Cys Ile Leu Leu Lys Leu Ala
130 135 140

Lys Arg Gly Thr Pro Arg Thr Leu Lys Trp Ile Arg Asn Phe Thr Asn
145 150 155 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Asp Gly Ala Ser Gly Ser
165 170 175

Lys Asp Lys Lys Pro Asp Arg Met Asn Lys Gly Lys Leu Lys Ile Ala
180 185 190

Pro Arg Glu His Glu Lys Asp Ser Lys Thr Lys Pro Pro Asp Ala Thr
195 200 205

```
Ile Val Val Glu Gly Val Lys Tyr Gln Ile Lys Lys Lys Gly Lys Val
    210                 215                 220

Lys Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys Asn Lys Pro
225                 230                 235                 240

Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala Val
                245                 250                 255

Ile Thr Ile Leu Leu Tyr Gln Pro Val Ala Ala Glu Asn Ile Thr Gln
            260                 265                 270

Trp Asn Leu Ser Asp Asn Gly Thr Asn Gly Ile Gln Arg Ala Met Tyr
        275                 280                 285

Leu Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro Glu Lys Ile
    290                 295                 300

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

Ile Arg Gly Met Met Asp Ala Ser Glu Arg Thr Asn Tyr Thr Cys Cys
                325                 330                 335

Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys Asn Trp Tyr
            340                 345                 350

Asn Ile Asp Pro Trp Ile Gln Leu Met Asn Arg Thr Gln Thr Asn Leu
        355                 360                 365

Thr Glu Gly Pro Pro Asp Lys Glu Cys Ala Val Thr Cys Arg Tyr Asp
    370                 375                 380

Lys Asn Thr Asp Val Asn Val Val Thr Gln Ala Arg Asn Arg Pro Thr
385                 390                 395                 400

Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe Ala Gly Thr
                405                 410                 415

Val Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp Ile Leu
            420                 425                 430

Tyr Gly Asp His Glu Gly Ser Leu Leu Gln Asp Thr Ala Leu Tyr Leu
        435                 440                 445
```

```
Leu Asp Gly Met Thr Asn Thr Ile Glu Asn Ala Arg Gln Gly Ala Ala
    450                 455                 460

Arg Val Thr Ser Trp Leu Gly Arg Gln Leu Ser Thr Ala Gly Lys Lys
465                 470                 475                 480

Leu Glu Arg Arg Ser Lys Thr Trp Phe Gly Ala Tyr Ala Leu Ser Pro
                485                 490                 495

Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Ile Trp Tyr Thr Asn Asn
            500                 505                 510

Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile Gly Pro Gly
        515                 520                 525

Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu Met Gly
    530                 535                 540

Gly His Leu Ser Glu Phe Leu Leu Leu Ser Leu Val Ile Leu Ser Asp
545                 550                 555                 560

Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Ile Leu His Tyr Ala
                565                 570                 575

Ile Pro Gln Ser His Glu Glu Pro Glu Gly Cys Asp Thr Asn Gln Leu
            580                 585                 590

Asn Leu Thr Val Lys Leu Arg Thr Glu Asp Val Val Pro Ser Ser Val
        595                 600                 605

Trp Asn Ile Gly Lys Tyr Val Cys Val Arg Pro Asp Trp Trp Pro Tyr
    610                 615                 620

Glu Thr Lys Val Ala Leu Leu Phe Glu Glu Ala Gly Gln Val Ile Lys
625                 630                 635                 640

Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Val Trp Asn Ser Ala
                645                 650                 655

Ser Thr Thr Ala Phe Leu Ile Cys Leu Ile Lys Val Leu Arg Gly Gln
            660                 665                 670
```

```
Val Val Gln Gly Ile Ile Trp Leu Leu Leu Val Thr Gly Ala Gln Gly
        675                 680                 685

Arg Leu Ala Cys Lys Glu Asp Tyr Arg Tyr Ala Ile Ser Ser Thr Asn
    690                 695                 700

Glu Ile Gly Leu Leu Gly Ala Glu Gly Leu Thr Thr Thr Trp Lys Glu
705                 710                 715                 720

Tyr Ser His Gly Leu Gln Leu Asp Asp Gly Thr Val Lys Ala Val Cys
                725                 730                 735

Thr Ala Gly Ser Phe Lys Val Thr Ala Leu Asn Val Val Ser Arg Arg
            740                 745                 750

Tyr Leu Ala Ser Leu His Lys Arg Ala Leu Pro Thr Ser Val Thr Phe
        755                 760                 765

Glu Leu Leu Phe Asp Gly Thr Asn Pro Ala Ile Glu Glu Met Asp Asp
    770                 775                 780

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

Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Tyr Leu Val
                805                 810                 815

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

Thr Thr Leu Arg Thr Glu Val Val Lys Thr Phe Arg Arg Asp Lys Pro
        835                 840                 845

Phe Pro His Arg Val Asp Cys Val Thr Thr Ile Val Glu Lys Glu Asp
    850                 855                 860

Leu Phe His Cys Lys Leu Gly Gly Asn Trp Thr Cys Val Lys Gly Asp
865                 870                 875                 880

Pro Val Thr Tyr Lys Gly Gly Gln Val Lys Gln Cys Arg Trp Cys Gly
                885                 890                 895

Phe Glu Phe Lys Glu Pro Tyr Gly Leu Pro His Tyr Pro Ile Gly Lys
            900                 905                 910
```

```
Cys Ile Leu Thr Asn Glu Thr Gly Tyr Arg Val Val Asp Ser Thr Asp
        915                 920                 925

Cys Asn Arg Asp Gly Val Val Ile Ser Thr Glu Gly Glu His Glu Cys
    930                 935                 940

Leu Ile Gly Asn Thr Thr Val Lys Val His Ala Leu Asp Glu Arg Leu
945                 950                 955                 960

Gly Pro Met Pro Cys Arg Pro Lys Glu Ile Val Ser Ser Glu Gly Pro
                965                 970                 975

Val Arg Lys Thr Ser Cys Thr Phe Asn Tyr Thr Lys Thr Leu Arg Asn
            980                 985                 990

Lys Tyr Tyr Glu Pro Arg Asp Ser  Tyr Phe Gln Gln Tyr  Met Leu Lys
        995                 1000                1005

Gly Glu  Tyr Gln Tyr Trp Phe  Asn Leu Asp Val Thr  Asp His His
    1010                1015                1020

Thr Asp  Tyr Phe Ala Glu Phe  Val Val Leu Val Val  Val Ala Leu
    1025                1030                1035

Leu Gly  Gly Arg Tyr Val Leu  Trp Leu Ile Val Thr  Tyr Ile Ile
    1040                1045                1050

Leu Thr  Glu Gln Leu Ala Ala  Gly Leu Gln Leu Gly  Gln Gly Glu
    1055                1060                1065

Val Val  Leu Ile Gly Asn Leu  Ile Thr His Thr Asp  Asn Glu Val
    1070                1075                1080

Val Val  Tyr Phe Leu Leu Leu  Tyr Leu Val Ile Arg  Asp Glu Pro
    1085                1090                1095

Ile Lys  Lys Trp Ile Leu Leu  Leu Phe His Ala Met  Thr Asn Asn
    1100                1105                1110

Pro Val  Lys Thr Ile Thr Val  Ala Leu Leu Met Ile  Ser Gly Val
    1115                1120                1125
```

```
Ala Lys  Gly Gly Lys Ile Asp  Gly Gly Trp Gln Arg  Gln Pro Val
    1130                 1135                 1140

Thr Ser  Phe Asp Ile Gln Leu  Ala Leu Ala Val Val  Val Val Val
    1145                 1150                 1155

Val Met  Leu Leu Ala Lys Arg  Asp Pro Thr Thr Phe  Pro Leu Val
    1160                 1165                 1170

Ile Thr  Val Ala Thr Leu Arg  Thr Ala Lys Ile Thr  Asn Gly Phe
    1175                 1180                 1185

Ser Thr  Asp Leu Val Ile Ala  Thr Val Ser Ala Ala  Leu Leu Thr
    1190                 1195                 1200

Trp Thr  Tyr Ile Ser Asp Tyr  Tyr Lys Tyr Lys Thr  Trp Leu Gln
    1205                 1210                 1215

Tyr Leu  Val Ser Thr Val Thr  Gly Ile Phe Leu Ile  Arg Val Leu
    1220                 1225                 1230

Lys Gly  Ile Gly Glu Leu Asp  Leu His Ala Pro Thr  Leu Pro Ser
    1235                 1240                 1245

His Arg  Pro Leu Phe Tyr Ile  Leu Val Tyr Leu Ile  Ser Thr Ala
    1250                 1255                 1260

Val Val  Thr Arg Trp Asn Leu  Asp Val Ala Gly Leu  Leu Leu Gln
    1265                 1270                 1275

Cys Val  Pro Thr Leu Leu Met  Val Phe Thr Met Trp  Ala Asp Ile
    1280                 1285                 1290

Leu Thr  Leu Ile Leu Ile Leu  Pro Thr Tyr Glu Leu  Thr Lys Leu
    1295                 1300                 1305

Tyr Tyr  Leu Lys Glu Val Lys  Ile Gly Ala Glu Arg  Gly Trp Leu
    1310                 1315                 1320

Trp Lys  Thr Asn Tyr Lys Arg  Val Asn Asp Ile Tyr  Glu Val Asp
    1325                 1330                 1335

Gln Thr  Ser Glu Gly Val Tyr  Leu Phe Pro Ser Lys  Gln Arg Thr
    1340                 1345                 1350
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```
Ser Ala  Ile Thr Ser Thr Met  Leu Pro Leu Ile Lys  Ala Ile Leu
    1355                 1360                 1365

Ile Ser  Cys Ile Ser Asn Lys  Trp Gln Leu Ile Tyr  Leu Leu Tyr
    1370                 1375                 1380

Leu Ile  Phe Glu Val Ser Tyr  Tyr Leu His Lys Lys  Val Ile Asp
    1385                 1390                 1395

Glu Ile  Ala Gly Gly Thr Asn  Phe Val Ser Arg Leu  Val Ala Ala
    1400                 1405                 1410

Leu Ile  Glu Val Asn Trp Ala  Phe Asp Asn Glu Glu  Val Lys Gly
    1415                 1420                 1425

Leu Lys  Lys Phe Phe Leu Leu  Ser Ser Arg Val Lys  Glu Leu Ile
    1430                 1435                 1440

Ile Lys  His Lys Val Arg Asn  Glu Val Val Val Arg  Trp Phe Gly
    1445                 1450                 1455

Asp Glu  Glu Ile Tyr Gly Met  Pro Lys Leu Ile Gly  Leu Val Lys
    1460                 1465                 1470

Ala Ala  Thr Leu Ser Arg Asn  Lys His Cys Met Leu  Cys Thr Val
    1475                 1480                 1485

Cys Glu  Asp Arg Asp Trp Arg  Gly Glu Thr Cys Pro  Lys Cys Gly
    1490                 1495                 1500

Arg Phe  Gly Pro Pro Val Val  Cys Gly Met Thr Leu  Ala Asp Phe
    1505                 1510                 1515

Glu Glu  Lys His Tyr Lys Arg  Ile Phe Ile Arg Glu  Asp Gln Ser
    1520                 1525                 1530

Gly Gly  Pro Leu Arg Glu Glu  His Ala Gly Tyr Leu  Gln Tyr Lys
    1535                 1540                 1545

Ala Arg  Gly Gln Leu Phe Leu  Arg Asn Leu Pro Val  Leu Ala Thr
    1550                 1555                 1560
```

```
Lys Val  Lys Met Leu Leu Val  Gly Asn Leu Gly Thr  Glu Ile Gly
    1565                 1570                 1575

Asp Leu  Glu His Leu Gly Trp  Val Leu Arg Gly Pro  Ala Val Cys
    1580                 1585                 1590

Lys Lys  Val Thr Glu His Glu  Arg Cys Thr Thr Ser  Ile Met Asp
    1595                 1600                 1605

Lys Leu  Thr Ala Phe Phe Gly  Val Met Pro Arg Gly  Thr Thr Pro
    1610                 1615                 1620

Arg Ala  Pro Val Arg Phe Pro  Thr Ser Leu Leu Lys  Ile Arg Arg
    1625                 1630                 1635

Gly Leu  Glu Thr Gly Trp Ala  Tyr Thr His Gln Gly  Gly Ile Ser
    1640                 1645                 1650

Ser Val  Asp His Val Thr Cys  Gly Lys Asp Leu Leu  Val Cys Asp
    1655                 1660                 1665

Thr Met  Gly Arg Thr Arg Val  Val Cys Gln Ser Asn  Asn Lys Met
    1670                 1675                 1680

Thr Asp  Glu Ser Glu Tyr Gly  Val Lys Thr Asp Ser  Gly Cys Pro
    1685                 1690                 1695

Glu Gly  Ala Arg Cys Tyr Val  Phe Asn Pro Glu Ala  Val Asn Ile
    1700                 1705                 1710

Ser Gly  Thr Lys Gly Ala Met  Val His Leu Gln Lys  Thr Gly Gly
    1715                 1720                 1725

Glu Phe  Thr Cys Val Thr Ala  Ser Gly Thr Pro Ala  Phe Phe Asp
    1730                 1735                 1740

Leu Lys  Asn Leu Lys Gly Trp  Ser Gly Leu Pro Ile  Phe Glu Ala
    1745                 1750                 1755

Ser Ser  Gly Arg Val Val Gly  Arg Val Lys Val Gly  Lys Asn Glu
    1760                 1765                 1770

Asp Ser  Lys Pro Thr Lys Leu  Met Ser Gly Ile Gln  Thr Val Ser
    1775                 1780                 1785
```

```
Lys Ser  Ala Thr Asp Leu Thr  Glu Met Val Lys Lys  Ile Thr Thr
    1790                 1795                 1800

Met Asn  Arg Gly Glu Phe Arg  Gln Ile Thr Leu Ala  Thr Gly Ala
    1805                 1810                 1815

Gly Lys  Thr Thr Glu Leu Pro  Arg Ser Val Ile Glu  Glu Ile Gly
    1820                 1825                 1830

Arg His  Lys Arg Val Leu Val  Leu Ile Pro Leu Arg  Ala Ala Ala
    1835                 1840                 1845

Glu Ser  Val Tyr Gln Tyr Met  Arg Gln Lys His Pro  Ser Ile Ala
    1850                 1855                 1860

Phe Asn  Leu Arg Ile Gly Glu  Met Lys Glu Gly Asp  Met Ala Thr
    1865                 1870                 1875

Gly Ile  Thr Tyr Ala Ser Tyr  Gly Tyr Phe Cys Gln  Met Ser Gln
    1880                 1885                 1890

Pro Lys  Leu Arg Ala Ala Met  Val Glu Tyr Ser Phe  Ile Phe Leu
    1895                 1900                 1905

Asp Glu  Tyr His Cys Ala Thr  Pro Glu Gln Leu Ala  Ile Met Gly
    1910                 1915                 1920

Lys Ile  His Arg Phe Ser Glu  Asn Leu Arg Val Val  Ala Met Thr
    1925                 1930                 1935

Ala Thr  Pro Ala Gly Thr Val  Thr Thr Thr Gly Gln  Lys His Pro
    1940                 1945                 1950

Ile Glu  Glu Phe Ile Ala Pro  Glu Val Met Lys Gly  Glu Asp Leu
    1955                 1960                 1965

Gly Ser  Glu Tyr Leu Asp Ile  Ala Gly Leu Lys Ile  Pro Val Glu
    1970                 1975                 1980

Glu Met  Lys Asn Asn Met Leu  Val Phe Val Pro Thr  Arg Asn Met
    1985                 1990                 1995
```

```
Ala Val  Glu Ala Ala Lys Lys  Leu Lys Ala Lys Gly  Tyr Asn Ser
     2000                 2005                 2010

Gly Tyr  Tyr Tyr Ser Gly Glu  Asp Pro Ser Asn Leu  Arg Val Val
     2015                 2020                 2025

Thr Ser  Gln Ser Pro Tyr Val  Val Val Ala Thr Asn  Ala Ile Glu
     2030                 2035                 2040

Ser Gly  Val Thr Leu Pro Asp  Leu Asp Val Val Val  Asp Thr Gly
     2045                 2050                 2055

Leu Lys  Cys Glu Lys Arg Ile  Arg Leu Ser Pro Lys  Met Pro Phe
     2060                 2065                 2070

Ile Val  Thr Gly Leu Lys Arg  Met Ala Val Thr Ile  Gly Glu Gln
     2075                 2080                 2085

Ala Gln  Arg Arg Gly Arg Val  Gly Arg Val Lys Pro  Gly Arg Tyr
     2090                 2095                 2100

Tyr Arg  Ser Gln Glu Thr Pro  Val Gly Ser Lys Asp  Tyr His Tyr
     2105                 2110                 2115

Asp Leu  Leu Gln Ala Gln Arg  Tyr Gly Ile Glu Asp  Gly Ile Asn
     2120                 2125                 2130

Ile Thr  Lys Ser Phe Arg Glu  Met Asn Tyr Asp Trp  Ser Leu Tyr
     2135                 2140                 2145

Glu Glu  Asp Ser Leu Met Ile  Thr Gln Leu Glu Ile  Leu Asn Asn
     2150                 2155                 2160

Leu Leu  Ile Ser Glu Glu Leu  Pro Met Ala Val Lys  Asn Ile Met
     2165                 2170                 2175

Ala Arg  Thr Asp His Pro Glu  Pro Ile Gln Leu Ala  Tyr Asn Ser
     2180                 2185                 2190

Tyr Glu  Thr Gln Val Pro Val  Leu Phe Pro Lys Ile  Arg Asn Gly
     2195                 2200                 2205

Glu Val  Thr Asp Thr Tyr Asp  Asn Tyr Thr Phe Leu  Asn Ala Arg
     2210                 2215                 2220
```

```
Lys Leu  Gly Asp Asp Val Pro  Pro Tyr Val Tyr Ala  Thr Glu Asp
    2225                 2230                 2235

Glu Asp  Leu Ala Val Glu Leu  Leu Gly Leu Asp Trp  Pro Asp Pro
    2240                 2245                 2250

Gly Asn  Gln Gly Thr Val Glu  Ala Gly Arg Ala Leu  Lys Gln Val
    2255                 2260                 2265

Val Gly  Leu Ser Thr Ala Glu  Asn Ala Leu Leu Val  Ala Leu Phe
    2270                 2275                 2280

Gly Tyr  Val Gly Tyr Gln Ala  Leu Ser Lys Arg His  Ile Pro Val
    2285                 2290                 2295

Val Thr  Asp Ile Tyr Ser Val  Glu Asp His Arg Leu  Glu Asp Thr
    2300                 2305                 2310

Thr His  Leu Gln Tyr Ala Pro  Asn Ala Ile Lys Thr  Glu Gly Lys
    2315                 2320                 2325

Glu Thr  Glu Leu Lys Glu Leu  Ala Gln Gly Asp Val  Gln Arg Cys
    2330                 2335                 2340

Val Glu  Ala Val Thr Asn Tyr  Ala Arg Glu Gly Ile  Gln Phe Met
    2345                 2350                 2355

Lys Ser  Gln Ala Leu Lys Val  Arg Glu Thr Pro Thr  Tyr Lys Glu
    2360                 2365                 2370

Thr Met  Asn Thr Val Ala Asp  Tyr Val Lys Lys Phe  Ile Glu Ala
    2375                 2380                 2385

Leu Thr  Asp Ser Lys Glu Asp  Ile Ile Lys Tyr Gly  Leu Trp Gly
    2390                 2395                 2400

Ala His  Thr Ala Leu Tyr Lys  Ser Ile Gly Ala Arg  Leu Gly His
    2405                 2410                 2415

Glu Thr  Ala Phe Ala Thr Leu  Val Val Lys Trp Leu  Ala Phe Gly
    2420                 2425                 2430
```

```
Gly Glu  Ser Ile Ser Asp His  Ile Lys Gln Ala Ala  Thr Asp Leu
    2435                 2440                 2445

Val Val  Tyr Tyr Ile Ile Asn  Arg Pro Gln Phe Pro  Gly Asp Thr
    2450                 2455                 2460

Glu Thr  Gln Gln Glu Gly Arg  Lys Phe Val Ala Ser  Leu Leu Val
    2465                 2470                 2475

Ser Ala  Leu Ala Thr Tyr Thr  Tyr Lys Ser Trp Asn  Tyr Asn Asn
    2480                 2485                 2490

Leu Ser  Lys Ile Val Glu Pro  Ala Leu Ala Thr Leu  Pro Tyr Ala
    2495                 2500                 2505

Ala Lys  Ala Leu Lys Leu Phe  Ala Pro Thr Arg Leu  Glu Ser Val
    2510                 2515                 2520

Val Ile  Leu Ser Thr Ala Ile  Tyr Lys Thr Tyr Leu  Ser Ile Arg
    2525                 2530                 2535

Arg Gly  Lys Ser Asp Gly Leu  Leu Gly Thr Gly Val  Ser Ala Ala
    2540                 2545                 2550

Met Glu  Ile Met Ser Gln Asn  Pro Val Ser Val Gly  Ile Ala Val
    2555                 2560                 2565

Met Leu  Gly Val Gly Ala Val  Ala Ala His Asn Ala  Ile Glu Ala
    2570                 2575                 2580

Ser Glu  Gln Lys Arg Thr Leu  Leu Met Lys Val Phe  Val Lys Asn
    2585                 2590                 2595

Phe Leu  Asp Gln Ala Ala Thr  Asp Glu Leu Val Lys  Glu Ser Pro
    2600                 2605                 2610

Glu Lys  Ile Ile Met Ala Leu  Phe Glu Ala Val Gln  Thr Val Gly
    2615                 2620                 2625

Asn Pro  Leu Arg Leu Val Tyr  His Leu Tyr Gly Val  Phe Tyr Lys
    2630                 2635                 2640

Gly Trp  Glu Ala Lys Glu Leu  Ala Gln Arg Thr Ala  Gly Arg Asn
    2645                 2650                 2655
```

```
Leu Phe  Thr Leu Ile Met Phe  Glu Ala Val Glu Leu  Leu Gly Val
    2660                 2665                 2670

Asp Ser  Glu Gly Lys Ile Arg  Gln Leu Ser Ser Asn  Tyr Ile Leu
    2675                 2680                 2685

Glu Leu  Leu Tyr Lys Phe Arg  Asp Asn Ile Lys Ser  Ser Val Arg
    2690                 2695                 2700

Glu Ile  Ala Ile Ser Trp Ala  Pro Ala Pro Phe Ser  Cys Asp Trp
    2705                 2710                 2715

Thr Pro  Thr Asp Asp Arg Ile  Gly Leu Pro His Asp  Asn Tyr Leu
    2720                 2725                 2730

Arg Val  Glu Thr Lys Cys Pro  Cys Gly Tyr Arg Met  Lys Ala Val
    2735                 2740                 2745

Lys Asn  Cys Ala Gly Glu Leu  Arg Leu Leu Glu Glu  Gly Gly Ser
    2750                 2755                 2760

Phe Leu  Cys Arg Asn Lys Phe  Gly Arg Gly Ser Gln  Asn Tyr Arg
    2765                 2770                 2775

Val Thr  Lys Tyr Tyr Asp Asp  Asn Leu Ser Glu Ile  Lys Pro Val
    2780                 2785                 2790

Ile Arg  Met Glu Gly His Val  Glu Leu Tyr Tyr Lys  Gly Ala Thr
    2795                 2800                 2805

Ile Lys  Leu Asp Phe Asn Asn  Ser Lys Thr Val Leu  Ala Thr Asp
    2810                 2815                 2820

Lys Trp  Glu Val Asp His Ser  Thr Leu Val Arg Ala  Leu Lys Arg
    2825                 2830                 2835

Tyr Thr  Gly Ala Gly Tyr Arg  Gly Ala Tyr Leu Gly  Glu Lys Pro
    2840                 2845                 2850

Asn His  Lys His Leu Ile Gln  Arg Asp Cys Ala Thr  Leu Thr Lys
    2855                 2860                 2865
```

```
Asp Lys  Val Cys Phe Ile Lys  Met Lys Arg Gly Cys  Ala Phe Thr
    2870                 2875                 2880

Tyr Asp  Leu Ser Leu His Asn  Leu Thr Arg Leu Ile  Glu Leu Val
    2885                 2890                 2895

His Lys  Asn Asn Leu Glu Asp  Arg Glu Ile Pro Ala  Val Thr Val
    2900                 2905                 2910

Thr Thr  Trp Leu Ala Tyr Thr  Phe Val Asn Glu Asp  Ile Gly Thr
    2915                 2920                 2925

Ile Lys  Pro Thr Phe Gly Glu  Lys Val Thr Pro Glu  Lys Gln Glu
    2930                 2935                 2940

Glu Val  Val Leu Gln Pro Ala  Val Val Val Asp Thr  Thr Asp Val
    2945                 2950                 2955

Ala Val  Thr Val Val Gly Glu  Thr Ser Thr Met Thr  Thr Gly Glu
    2960                 2965                 2970

Thr Pro  Thr Thr Phe Thr Ser  Leu Gly Ser Asp Ser  Lys Val Arg
    2975                 2980                 2985

Gln Val  Leu Lys Leu Gly Val  Asp Asp Gly Gln Tyr  Pro Gly Pro
    2990                 2995                 3000

Asn Gln  Gln Arg Ala Ser Leu  Leu Glu Ala Ile Gln  Gly Val Asp
    3005                 3010                 3015

Glu Arg  Pro Ser Val Leu Ile  Leu Gly Ser Asp Lys  Ala Thr Ser
    3020                 3025                 3030

Asn Arg  Val Lys Thr Ala Lys  Asn Val Lys Ile Tyr  Arg Ser Arg
    3035                 3040                 3045

Asp Pro  Leu Glu Leu Arg Glu  Met Met Lys Arg Gly  Lys Ile Leu
    3050                 3055                 3060

Val Val  Ala Leu Ser Arg Val  Asp Thr Ala Leu Leu  Lys Phe Val
    3065                 3070                 3075

Asp Tyr  Lys Gly Thr Phe Leu  Thr Arg Glu Thr Leu  Glu Ala Leu
    3080                 3085                 3090
```

```
Ser Leu  Gly Lys Pro Lys Lys  Arg Asp Ile Thr Lys  Ala Glu Ala
    3095                 3100                 3105

Gln Trp  Leu Leu Arg Leu Glu  Asp Gln Ile Glu Glu  Leu Pro Asp
    3110                 3115                 3120

Trp Phe  Ala Ala Lys Glu Pro  Ile Phe Leu Glu Ala  Asn Ile Lys
    3125                 3130                 3135

Arg Asp  Lys Tyr His Leu Val  Gly Asp Ile Ala Thr  Ile Lys Glu
    3140                 3145                 3150

Lys Ala  Lys Gln Leu Gly Ala  Thr Asp Ser Thr Lys  Ile Ser Lys
    3155                 3160                 3165

Glu Val  Gly Ala Lys Val Tyr  Ser Met Lys Leu Ser  Asn Trp Val
    3170                 3175                 3180

Ile Gln  Glu Glu Asn Lys Gln  Gly Ser Leu Ala Pro  Leu Phe Glu
    3185                 3190                 3195

Glu Leu  Leu Gln Gln Cys Pro  Pro Gly Gly Gln Asn  Lys Thr Thr
    3200                 3205                 3210

His Met  Val Ser Ala Tyr Gln  Leu Ala Gln Gly Asn  Trp Val Pro
    3215                 3220                 3225

Val Ser  Cys His Val Phe Met  Gly Thr Ile Pro Ala  Arg Arg Thr
    3230                 3235                 3240

Lys Thr  His Pro Tyr Glu Ala  Tyr Val Lys Leu Arg  Glu Leu Val
    3245                 3250                 3255

Asp Glu  His Lys Met Lys Ala  Leu Cys Gly Gly Ser  Gly Leu Ser
    3260                 3265                 3270

Lys His  Asn Glu Trp Val Ile  Gly Lys Val Lys Tyr  Gln Gly Asn
    3275                 3280                 3285

Leu Arg  Thr Lys His Met Leu  Asn Pro Gly Lys Val  Ala Glu Gln
    3290                 3295                 3300
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```
Leu His  Arg Glu Gly Tyr Arg  His Asn Val Tyr Asn  Lys Thr Ile
    3305                 3310                 3315

Gly Ser  Val Met Thr Ala Thr  Gly Ile Arg Leu Glu  Lys Leu Pro
    3320                 3325                 3330

Val Val  Arg Ala Gln Thr Asp  Thr Thr Asn Phe His  Gln Ala Ile
    3335                 3340                 3345

Arg Asp  Lys Ile Asp Lys Glu  Glu Asn Leu Gln Thr  Pro Gly Leu
    3350                 3355                 3360

His Lys  Lys Leu Met Glu Val  Phe Asn Ala Leu Lys  Arg Pro Glu
    3365                 3370                 3375

Leu Glu  Ala Ser Tyr Asp Ala  Val Asp Trp Glu Glu  Leu Glu Arg
    3380                 3385                 3390

Gly Ile  Asn Arg Lys Gly Ala  Ala Gly Phe Phe Glu  Arg Lys Asn
    3395                 3400                 3405

Ile Gly  Glu Val Leu Asp Ser  Glu Lys Asn Lys Val  Glu Glu Val
    3410                 3415                 3420

Ile Asp  Ser Leu Lys Lys Gly  Arg Asn Ile Arg Tyr  Tyr Glu Thr
    3425                 3430                 3435

Ala Ile  Pro Lys Asn Glu Lys  Arg Asp Val Asn Asp  Asp Trp Thr
    3440                 3445                 3450

Ala Gly  Asp Phe Val Asp Glu  Lys Lys Pro Arg Val  Ile Gln Tyr
    3455                 3460                 3465

Pro Glu  Ala Lys Thr Arg Leu  Ala Ile Thr Lys Val  Met Tyr Lys
    3470                 3475                 3480

Trp Val  Lys Gln Lys Pro Val  Val Ile Pro Gly Tyr  Glu Gly Lys
    3485                 3490                 3495

Thr Pro  Leu Phe Gln Ile Phe  Asp Lys Val Lys Lys  Glu Trp Asp
    3500                 3505                 3510

Gln Phe  Gln Asn Pro Val Ala  Val Ser Phe Asp Thr  Lys Ala Trp
    3515                 3520                 3525
```

```
Asp Thr  Gln Val Thr Thr Arg  Asp Leu Glu Leu Ile  Arg Asp Ile
    3530                 3535                 3540

Gln Lys  Phe Tyr Phe Lys Lys  Lys Trp His Lys Phe  Ile Asp Thr
    3545                 3550                 3555

Leu Thr  Lys His Met Ser Glu  Val Pro Val Ile Ser  Ala Asp Gly
    3560                 3565                 3570

Glu Val  Tyr Ile Arg Lys Gly  Gln Arg Gly Ser Gly  Gln Pro Asp
    3575                 3580                 3585

Thr Ser  Ala Gly Asn Ser Met  Leu Asn Val Leu Thr  Met Val Tyr
    3590                 3595                 3600

Ala Phe  Cys Glu Ala Thr Gly  Val Pro Tyr Lys Ser  Phe Asp Arg
    3605                 3610                 3615

Val Ala  Lys Ile His Val Cys  Gly Asp Asp Gly Phe  Leu Ile Thr
    3620                 3625                 3630

Glu Arg  Ala Leu Gly Glu Lys  Phe Ala Ser Lys Gly  Val Gln Ile
    3635                 3640                 3645

Leu Tyr  Glu Ala Gly Lys Pro  Gln Lys Ile Thr Glu  Gly Asp Lys
    3650                 3655                 3660

Met Lys  Val Ala Tyr Gln Phe  Asp Asp Ile Glu Phe  Cys Ser His
    3665                 3670                 3675

Thr Pro  Val Gln Val Arg Trp  Ser Asp Asn Thr Ser  Ser Tyr Met
    3680                 3685                 3690

Pro Gly  Arg Asn Thr Thr Thr  Ile Leu Ala Lys Met  Ala Thr Arg
    3695                 3700                 3705

Leu Asp  Ser Ser Gly Glu Arg  Gly Thr Ile Ala Tyr  Glu Lys Ala
    3710                 3715                 3720

Val Ala  Phe Ser Phe Leu Leu  Met Tyr Ser Trp Asn  Pro Leu Ile
    3725                 3730                 3735
```

```
Arg Arg  Ile Cys Leu Leu Val  Leu Ser Thr Glu Leu  Gln Val Arg
    3740                 3745                 3750

Pro Gly  Lys Ser Thr Thr Tyr  Tyr Tyr Glu Gly Asp  Pro Ile Ser
    3755                 3760                 3765

Ala Tyr  Lys Glu Val Ile Gly  His Asn Leu Phe Asp  Leu Lys Arg
    3770                 3775                 3780

Thr Ser  Phe Glu Lys Leu Ala  Lys Leu Asn Leu Ser  Met Ser Thr
    3785                 3790                 3795

Leu Gly  Val Trp Thr Arg His  Thr Ser Lys Arg Leu  Leu Gln Asp
    3800                 3805                 3810

Cys Val  Asn Val Gly Thr Lys  Glu Gly Asn Trp Leu  Val Asn Ala
    3815                 3820                 3825

Asp Arg  Leu Val Ser Ser Lys  Thr Gly Asn Arg Tyr  Ile Pro Gly
    3830                 3835                 3840

Glu Gly  His Thr Leu Gln Gly  Lys His Tyr Glu Glu  Leu Ile Leu
    3845                 3850                 3855

Ala Arg  Lys Pro Ile Gly Asn  Phe Glu Gly Thr Asp  Arg Tyr Asn
    3860                 3865                 3870

Leu Gly  Pro Ile Val Asn Val  Val Leu Arg Arg Leu  Lys Ile Met
    3875                 3880                 3885

Met Met  Ala Leu Ile Gly Arg  Gly Val
    3890                 3895
```

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<211> 3898
<212> PRT
<213> CSFV

<400> 3

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Met Glu Leu Asn His Phe Glu Leu Leu Tyr Lys Thr Ser Lys Gln Lys
1               5                  10                  15

Pro Val Gly Val Glu Glu Pro Val Tyr Asp Thr Ala Gly Arg Pro Leu
            20                  25                  30
```

```
Phe Gly Asn Pro Ser Glu Val His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Asp Arg Gly Arg Gly Asp Ile Arg Thr Thr Leu Arg Asp Leu Pro
    50                  55                  60

Arg Lys Gly Asp Cys Arg Ser Gly Asn His Leu Gly Pro Val Ser Gly
65                  70                  75                  80

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

Val Tyr His Arg Ala Pro Leu Glu Phe Phe Asp Glu Ala Gln Phe Cys
            100                 105                 110

Glu Val Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Gly Lys Leu
        115                 120                 125

Tyr His Ile Tyr Val Cys Val Asp Gly Cys Ile Leu Leu Lys Leu Ala
    130                 135                 140

Lys Arg Gly Thr Pro Arg Thr Leu Lys Trp Ile Arg Asn Phe Thr Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Asp Gly Ala Ser Gly Ser
                165                 170                 175

Lys Asp Lys Lys Pro Asp Arg Met Asn Lys Gly Lys Leu Lys Ile Ala
            180                 185                 190

Pro Arg Glu His Glu Lys Asp Ser Lys Thr Lys Pro Pro Asp Ala Thr
        195                 200                 205

Ile Val Val Glu Gly Val Lys Tyr Gln Ile Lys Lys Lys Gly Lys Val
    210                 215                 220

Lys Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys Asn Lys Pro
225                 230                 235                 240

Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala Val
                245                 250                 255

Ile Thr Ile Leu Leu Tyr Gln Pro Val Ala Ala Glu Asn Ile Thr Gln
```

```
            260                 265                 270

Trp Asn Leu Ser Asp Asn Gly Thr Asn Gly Ile Gln Arg Ala Met Tyr
        275                 280                 285

Leu Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro Glu Lys Ile
    290                 295                 300

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

Ile Arg Gly Met Met Asp Ala Ser Glu Arg Thr Asn Tyr Thr Cys Cys
                325                 330                 335

Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys Asn Trp Tyr
            340                 345                 350

Asn Ile Asp Pro Trp Ile Gln Leu Met Asn Arg Thr Gln Thr Asn Leu
        355                 360                 365

Thr Glu Gly Pro Pro Asp Lys Glu Cys Ala Val Thr Cys Arg Tyr Asp
    370                 375                 380

Lys Asn Thr Asp Val Asn Val Val Thr Gln Ala Arg Asn Arg Pro Thr
385                 390                 395                 400

Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe Ala Gly Thr
                405                 410                 415

Val Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp Ile Leu
            420                 425                 430

Tyr Gly Asp His Glu Ser Gly Ser Leu Leu Gln Asp Thr Ala Leu Tyr
        435                 440                 445

Leu Leu Asp Gly Met Thr Asn Thr Ile Glu Asn Ala Arg Gln Gly Ala
    450                 455                 460

Ala Arg Val Thr Ser Trp Leu Gly Arg Gln Leu Ser Thr Ala Gly Lys
465                 470                 475                 480

Lys Leu Glu Arg Arg Ser Lys Thr Trp Phe Gly Ala Tyr Ala Leu Ser
                485                 490                 495
```

```
Pro Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Ile Trp Tyr Thr Asn
            500                 505                 510

Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile Gly Pro
        515                 520                 525

Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu Met
    530                 535                 540

Gly Gly His Leu Ser Glu Phe Leu Leu Leu Ser Leu Val Ile Leu Ser
545                 550                 555                 560

Asp Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Ile Leu His Tyr
                565                 570                 575

Ala Ile Pro Gln Ser His Glu Glu Pro Glu Gly Cys Asp Thr Asn Gln
            580                 585                 590

Leu Asn Leu Thr Val Lys Leu Arg Thr Glu Asp Val Val Pro Ser Ser
        595                 600                 605

Val Trp Asn Ile Gly Lys Tyr Val Cys Val Arg Pro Asp Trp Trp Pro
    610                 615                 620

Tyr Glu Thr Lys Val Ala Leu Leu Phe Glu Glu Ala Gly Gln Val Ile
625                 630                 635                 640

Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Val Trp Asn Ser
                645                 650                 655

Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Ile Lys Val Leu Arg Gly
            660                 665                 670

Gln Val Val Gln Gly Ile Ile Trp Leu Leu Leu Val Thr Gly Ala Gln
        675                 680                 685

Gly Arg Leu Ala Cys Lys Glu Asp Tyr Arg Tyr Ala Ile Ser Ser Thr
    690                 695                 700

Asn Glu Ile Gly Leu Leu Gly Ala Glu Gly Leu Thr Thr Thr Trp Lys
705                 710                 715                 720

Glu Tyr Ser His Gly Leu Gln Leu Asp Asp Gly Thr Val Lys Ala Val
```

725 730 735

Cys Thr Ala Gly Ser Phe Lys Val Thr Ala Leu Asn Val Val Ser Arg
740 745 750

Arg Tyr Leu Ala Ser Leu His Lys Arg Ala Leu Pro Thr Ser Val Thr
755 760 765

Phe Glu Leu Leu Phe Asp Gly Thr Asn Pro Ala Ile Glu Glu Met Asp
770 775 780

Asp Asp Phe Gly Phe Gly Leu Cys Pro Phe Asp Thr Ser Pro Val Ile
785 790 795 800

Lys Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Tyr Leu
805 810 815

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

Pro Thr Thr Leu Arg Thr Glu Val Val Lys Thr Phe Arg Arg Asp Lys
835 840 845

Pro Phe Pro His Arg Val Asp Cys Val Thr Thr Ile Val Glu Lys Glu
850 855 860

Asp Leu Phe His Cys Lys Leu Gly Gly Asn Trp Thr Cys Val Lys Gly
865 870 875 880

Asp Pro Val Thr Tyr Lys Gly Gly Gln Val Lys Gln Cys Arg Trp Cys
885 890 895

Gly Phe Glu Phe Lys Glu Pro Tyr Gly Leu Pro His Tyr Pro Ile Gly
900 905 910

Lys Cys Ile Leu Thr Asn Glu Thr Gly Tyr Arg Val Val Asp Ser Thr
915 920 925

Asp Cys Asn Arg Asp Gly Val Val Ile Ser Thr Glu Gly Glu His Glu
930 935 940

Cys Leu Ile Gly Asn Thr Thr Val Lys Val His Ala Leu Asp Glu Arg
945 950 955 960

```
Leu Gly Pro Met Pro Cys Arg Pro Lys Glu Ile Val Ser Ser Glu Gly
                965                 970                 975

Pro Val Arg Lys Thr Ser Cys Thr Phe Asn Tyr Thr Lys Thr Leu Arg
            980                 985                 990

Asn Lys Tyr Tyr Glu Pro Arg Asp  Ser Tyr Phe Gln Gln  Tyr Met Leu
        995                 1000                1005

Lys Gly  Glu Tyr Gln Tyr Trp  Phe Asn Leu Asp Val  Thr Asp His
    1010                1015                1020

His Thr  Asp Tyr Phe Ala Glu  Phe Val Val Leu Val  Val Val Ala
    1025                1030                1035

Leu Leu  Gly Gly Arg Tyr Val  Leu Trp Leu Ile Val  Thr Tyr Ile
    1040                1045                1050

Ile Leu  Thr Glu Gln Leu Ala  Ala Gly Leu Gln Leu  Gly Gln Gly
    1055                1060                1065

Glu Val  Val Leu Ile Gly Asn  Leu Ile Thr His Thr  Asp Asn Glu
    1070                1075                1080

Val Val  Val Tyr Phe Leu Leu  Leu Tyr Leu Val Ile  Arg Asp Glu
    1085                1090                1095

Pro Ile  Lys Lys Trp Ile Leu  Leu Leu Phe His Ala  Met Thr Asn
    1100                1105                1110

Asn Pro  Val Lys Thr Ile Thr  Val Ala Leu Leu Met  Ile Ser Gly
    1115                1120                1125

Val Ala  Lys Gly Gly Lys Ile  Asp Gly Gly Trp Gln  Arg Gln Pro
    1130                1135                1140

Val Thr  Ser Phe Asp Ile Gln  Leu Ala Leu Ala Val  Val Val Val
    1145                1150                1155

Val Val  Met Leu Leu Ala Lys  Arg Asp Pro Thr Thr  Phe Pro Leu
    1160                1165                1170

Val Ile  Thr Val Ala Thr Leu  Arg Thr Ala Lys Ile  Thr Asn Gly
```

```
    1175                1180                1185

Phe Ser  Thr Asp Leu Val Ile  Ala Thr Val Ser Ala  Ala Leu Leu
    1190                1195                1200

Thr Trp  Thr Tyr Ile Ser Asp  Tyr Tyr Lys Tyr Lys  Thr Trp Leu
    1205                1210                1215

Gln Tyr  Leu Val Ser Thr Val  Thr Gly Ile Phe Leu  Ile Arg Val
    1220                1225                1230

Leu Lys  Gly Ile Gly Glu Leu  Asp Leu His Ala Pro  Thr Leu Pro
    1235                1240                1245

Ser His  Arg Pro Leu Phe Tyr  Ile Leu Val Tyr Leu  Ile Ser Thr
    1250                1255                1260

Ala Val  Val Thr Arg Trp Asn  Leu Asp Val Ala Gly  Leu Leu Leu
    1265                1270                1275

Gln Cys  Val Pro Thr Leu Leu  Met Val Phe Thr Met  Trp Ala Asp
    1280                1285                1290

Ile Leu  Thr Leu Ile Leu Ile  Leu Pro Thr Tyr Glu  Leu Thr Lys
    1295                1300                1305

Leu Tyr  Tyr Leu Lys Glu Val  Lys Ile Gly Ala Glu  Arg Gly Trp
    1310                1315                1320

Leu Trp  Lys Thr Asn Tyr Lys  Arg Val Asn Asp Ile  Tyr Glu Val
    1325                1330                1335

Asp Gln  Thr Ser Glu Gly Val  Tyr Leu Phe Pro Ser  Lys Gln Arg
    1340                1345                1350

Thr Ser  Ala Ile Thr Ser Thr  Met Leu Pro Leu Ile  Lys Ala Ile
    1355                1360                1365

Leu Ile  Ser Cys Ile Ser Asn  Lys Trp Gln Leu Ile  Tyr Leu Leu
    1370                1375                1380

Tyr Leu  Ile Phe Glu Val Ser  Tyr Tyr Leu His Lys  Lys Val Ile
    1385                1390                1395
```

Asp Glu Ile Ala Gly Gly Thr Asn Phe Val Ser Arg Leu Val Ala
1400 1405 1410

Ala Leu Ile Glu Val Asn Trp Ala Phe Asp Asn Glu Glu Val Lys
1415 1420 1425

Gly Leu Lys Lys Phe Phe Leu Leu Ser Ser Arg Val Lys Glu Leu
1430 1435 1440

Ile Ile Lys His Lys Val Arg Asn Glu Val Val Val Arg Trp Phe
1445 1450 1455

Gly Asp Glu Glu Ile Tyr Gly Met Pro Lys Leu Ile Gly Leu Val
1460 1465 1470

Lys Ala Ala Thr Leu Ser Arg Asn Lys His Cys Met Leu Cys Thr
1475 1480 1485

Val Cys Glu Asp Arg Asp Trp Arg Gly Glu Thr Cys Pro Lys Cys
1490 1495 1500

Gly Arg Phe Gly Pro Pro Val Val Cys Gly Met Thr Leu Ala Asp
1505 1510 1515

Phe Glu Glu Lys His Tyr Lys Arg Ile Phe Ile Arg Glu Asp Gln
1520 1525 1530

Ser Gly Gly Pro Leu Arg Glu Glu His Ala Gly Tyr Leu Gln Tyr
1535 1540 1545

Lys Ala Arg Gly Gln Leu Phe Leu Arg Asn Leu Pro Val Leu Ala
1550 1555 1560

Thr Lys Val Lys Met Leu Leu Val Gly Asn Leu Gly Thr Glu Ile
1565 1570 1575

Gly Asp Leu Glu His Leu Gly Trp Val Leu Arg Gly Pro Ala Val
1580 1585 1590

Cys Lys Lys Val Thr Glu His Glu Arg Cys Thr Thr Ser Ile Met
1595 1600 1605

Asp Lys Leu Thr Ala Phe Phe Gly Val Met Pro Arg Gly Thr Thr

1610 1615 1620

Pro Arg Ala Pro Val Arg Phe Pro Thr Ser Leu Leu Lys Ile Arg
1625 1630 1635

Arg Gly Leu Glu Thr Gly Trp Ala Tyr Thr His Gln Gly Gly Ile
1640 1645 1650

Ser Ser Val Asp His Val Thr Cys Gly Lys Asp Leu Leu Val Cys
1655 1660 1665

Asp Thr Met Gly Arg Thr Arg Val Val Cys Gln Ser Asn Asn Lys
1670 1675 1680

Met Thr Asp Glu Ser Glu Tyr Gly Val Lys Thr Asp Ser Gly Cys
1685 1690 1695

Pro Glu Gly Ala Arg Cys Tyr Val Phe Asn Pro Glu Ala Val Asn
1700 1705 1710

Ile Ser Gly Thr Lys Gly Ala Met Val His Leu Gln Lys Thr Gly
1715 1720 1725

Gly Glu Phe Thr Cys Val Thr Ala Ser Gly Thr Pro Ala Phe Phe
1730 1735 1740

Asp Leu Lys Asn Leu Lys Gly Trp Ser Gly Leu Pro Ile Phe Glu
1745 1750 1755

Ala Ser Ser Gly Arg Val Val Gly Arg Val Lys Val Gly Lys Asn
1760 1765 1770

Glu Asp Ser Lys Pro Thr Lys Leu Met Ser Gly Ile Gln Thr Val
1775 1780 1785

Ser Lys Ser Ala Thr Asp Leu Thr Glu Met Val Lys Lys Ile Thr
1790 1795 1800

Thr Met Asn Arg Gly Glu Phe Arg Gln Ile Thr Leu Ala Thr Gly
1805 1810 1815

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

```
Gly Arg  His Lys Arg Val Leu  Val Leu Ile Pro Leu  Arg Ala Ala
    1835                 1840                 1845

Ala Glu  Ser Val Tyr Gln Tyr  Met Arg Gln Lys His  Pro Ser Ile
    1850                 1855                 1860

Ala Phe  Asn Leu Arg Ile Gly  Glu Met Lys Glu Gly  Asp Met Ala
    1865                 1870                 1875

Thr Gly  Ile Thr Tyr Ala Ser  Tyr Gly Tyr Phe Cys  Gln Met Ser
    1880                 1885                 1890

Gln Pro  Lys Leu Arg Ala Ala  Met Val Glu Tyr Ser  Phe Ile Phe
    1895                 1900                 1905

Leu Asp  Glu Tyr His Cys Ala  Thr Pro Glu Gln Leu  Ala Ile Met
    1910                 1915                 1920

Gly Lys  Ile His Arg Phe Ser  Glu Asn Leu Arg Val  Val Ala Met
    1925                 1930                 1935

Thr Ala  Thr Pro Ala Gly Thr  Val Thr Thr Thr Gly  Gln Lys His
    1940                 1945                 1950

Pro Ile  Glu Glu Phe Ile Ala  Pro Glu Val Met Lys  Gly Glu Asp
    1955                 1960                 1965

Leu Gly  Ser Glu Tyr Leu Asp  Ile Ala Gly Leu Lys  Ile Pro Val
    1970                 1975                 1980

Glu Glu  Met Lys Asn Asn Met  Leu Val Phe Val Pro  Thr Arg Asn
    1985                 1990                 1995

Met Ala  Val Glu Ala Ala Lys  Lys Leu Lys Ala Lys  Gly Tyr Asn
    2000                 2005                 2010

Ser Gly  Tyr Tyr Tyr Ser Gly  Glu Asp Pro Ser Asn  Leu Arg Val
    2015                 2020                 2025

Val Thr  Ser Gln Ser Pro Tyr  Val Val Val Ala Thr  Asn Ala Ile
    2030                 2035                 2040

Glu Ser  Gly Val Thr Leu Pro  Asp Leu Asp Val Val  Val Asp Thr
```

2045 2050 2055

Gly Leu Lys Cys Glu Lys Arg Ile Arg Leu Ser Pro Lys Met Pro
2060 2065 2070

Phe Ile Val Thr Gly Leu Lys Arg Met Ala Val Thr Ile Gly Glu
2075 2080 2085

Gln Ala Gln Arg Arg Gly Arg Val Gly Arg Val Lys Pro Gly Arg
2090 2095 2100

Tyr Tyr Arg Ser Gln Glu Thr Pro Val Gly Ser Lys Asp Tyr His
2105 2110 2115

Tyr Asp Leu Leu Gln Ala Gln Arg Tyr Gly Ile Glu Asp Gly Ile
2120 2125 2130

Asn Ile Thr Lys Ser Phe Arg Glu Met Asn Tyr Asp Trp Ser Leu
2135 2140 2145

Tyr Glu Glu Asp Ser Leu Met Ile Thr Gln Leu Glu Ile Leu Asn
2150 2155 2160

Asn Leu Leu Ile Ser Glu Glu Leu Pro Met Ala Val Lys Asn Ile
2165 2170 2175

Met Ala Arg Thr Asp His Pro Glu Pro Ile Gln Leu Ala Tyr Asn
2180 2185 2190

Ser Tyr Glu Thr Gln Val Pro Val Leu Phe Pro Lys Ile Arg Asn
2195 2200 2205

Gly Glu Val Thr Asp Thr Tyr Asp Asn Tyr Thr Phe Leu Asn Ala
2210 2215 2220

Arg Lys Leu Gly Asp Asp Val Pro Pro Tyr Val Tyr Ala Thr Glu
2225 2230 2235

Asp Glu Asp Leu Ala Val Glu Leu Leu Gly Leu Asp Trp Pro Asp
2240 2245 2250

Pro Gly Asn Gln Gly Thr Val Glu Ala Gly Arg Ala Leu Lys Gln
2255 2260 2265

```
Val Val  Gly Leu Ser Thr Ala  Glu Asn Ala Leu Leu  Val Ala Leu
    2270                 2275                 2280

Phe Gly  Tyr Val Gly Tyr Gln  Ala Leu Ser Lys Arg  His Ile Pro
    2285                 2290                 2295

Val Val  Thr Asp Ile Tyr Ser  Val Glu Asp His Arg  Leu Glu Asp
    2300                 2305                 2310

Thr Thr  His Leu Gln Tyr Ala  Pro Asn Ala Ile Lys  Thr Glu Gly
    2315                 2320                 2325

Lys Glu  Thr Glu Leu Lys Glu  Leu Ala Gln Gly Asp  Val Gln Arg
    2330                 2335                 2340

Cys Val  Glu Ala Val Thr Asn  Tyr Ala Arg Glu Gly  Ile Gln Phe
    2345                 2350                 2355

Met Lys  Ser Gln Ala Leu Lys  Val Arg Glu Thr Pro  Thr Tyr Lys
    2360                 2365                 2370

Glu Thr  Met Asn Thr Val Ala  Asp Tyr Val Lys Lys  Phe Ile Glu
    2375                 2380                 2385

Ala Leu  Thr Asp Ser Lys Glu  Asp Ile Ile Lys Tyr  Gly Leu Trp
    2390                 2395                 2400

Gly Ala  His Thr Ala Leu Tyr  Lys Ser Ile Gly Ala  Arg Leu Gly
    2405                 2410                 2415

His Glu  Thr Ala Phe Ala Thr  Leu Val Val Lys Trp  Leu Ala Phe
    2420                 2425                 2430

Gly Gly  Glu Ser Ile Ser Asp  His Ile Lys Gln Ala  Ala Thr Asp
    2435                 2440                 2445

Leu Val  Val Tyr Tyr Ile Ile  Asn Arg Pro Gln Phe  Pro Gly Asp
    2450                 2455                 2460

Thr Glu  Thr Gln Gln Glu Gly  Arg Lys Phe Val Ala  Ser Leu Leu
    2465                 2470                 2475

Val Ser  Ala Leu Ala Thr Tyr  Thr Tyr Lys Ser Trp  Asn Tyr Asn
```

2480 2485 2490

Asn Leu Ser Lys Ile Val Glu Pro Ala Leu Ala Thr Leu Pro Tyr
2495 2500 2505

Ala Ala Lys Ala Leu Lys Leu Phe Ala Pro Thr Arg Leu Glu Ser
2510 2515 2520

Val Val Ile Leu Ser Thr Ala Ile Tyr Lys Thr Tyr Leu Ser Ile
2525 2530 2535

Arg Arg Gly Lys Ser Asp Gly Leu Leu Gly Thr Gly Val Ser Ala
2540 2545 2550

Ala Met Glu Ile Met Ser Gln Asn Pro Val Ser Val Gly Ile Ala
2555 2560 2565

Val Met Leu Gly Val Gly Ala Val Ala Ala His Asn Ala Ile Glu
2570 2575 2580

Ala Ser Glu Gln Lys Arg Thr Leu Leu Met Lys Val Phe Val Lys
2585 2590 2595

Asn Phe Leu Asp Gln Ala Ala Thr Asp Glu Leu Val Lys Glu Ser
2600 2605 2610

Pro Glu Lys Ile Ile Met Ala Leu Phe Glu Ala Val Gln Thr Val
2615 2620 2625

Gly Asn Pro Leu Arg Leu Val Tyr His Leu Tyr Gly Val Phe Tyr
2630 2635 2640

Lys Gly Trp Glu Ala Lys Glu Leu Ala Gln Arg Thr Ala Gly Arg
2645 2650 2655

Asn Leu Phe Thr Leu Ile Met Phe Glu Ala Val Glu Leu Leu Gly
2660 2665 2670

Val Asp Ser Glu Gly Lys Ile Arg Gln Leu Ser Ser Asn Tyr Ile
2675 2680 2685

Leu Glu Leu Leu Tyr Lys Phe Arg Asp Asn Ile Lys Ser Ser Val
2690 2695 2700

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Arg Glu  Ile Ala Ile Ser Trp  Ala Pro Ala Pro Phe  Ser Cys Asp
    2705                 2710                 2715

Trp Thr  Pro Thr Asp Asp Arg  Ile Gly Leu Pro His  Asp Asn Tyr
    2720                 2725                 2730

Leu Arg  Val Glu Thr Lys Cys  Pro Cys Gly Tyr Arg  Met Lys Ala
    2735                 2740                 2745

Val Lys  Asn Cys Ala Gly Glu  Leu Arg Leu Leu Glu  Glu Gly Gly
    2750                 2755                 2760

Ser Phe  Leu Cys Arg Asn Lys  Phe Gly Arg Gly Ser  Gln Asn Tyr
    2765                 2770                 2775

Arg Val  Thr Lys Tyr Tyr Asp  Asp Asn Leu Ser Glu  Ile Lys Pro
    2780                 2785                 2790

Val Ile  Arg Met Glu Gly His  Val Glu Leu Tyr Tyr  Lys Gly Ala
    2795                 2800                 2805

Thr Ile  Lys Leu Asp Phe Asn  Asn Ser Lys Thr Val  Leu Ala Thr
    2810                 2815                 2820

Asp Lys  Trp Glu Val Asp His  Ser Thr Leu Val Arg  Ala Leu Lys
    2825                 2830                 2835

Arg Tyr  Thr Gly Ala Gly Tyr  Arg Gly Ala Tyr Leu  Gly Glu Lys
    2840                 2845                 2850

Pro Asn  His Lys His Leu Ile  Gln Arg Asp Cys Ala  Thr Leu Thr
    2855                 2860                 2865

Lys Asp  Lys Val Cys Phe Ile  Lys Met Lys Arg Gly  Cys Ala Phe
    2870                 2875                 2880

Thr Tyr  Asp Leu Ser Leu His  Asn Leu Thr Arg Leu  Ile Glu Leu
    2885                 2890                 2895

Val His  Lys Asn Asn Leu Glu  Asp Arg Glu Ile Pro  Ala Val Thr
    2900                 2905                 2910

Val Thr  Thr Trp Leu Ala Tyr  Thr Phe Val Asn Glu  Asp Ile Gly
```

2915 2920 2925

Thr Ile Lys Pro Thr Phe Gly Glu Lys Val Thr Pro Glu Lys Gln
2930 2935 2940

Glu Glu Val Val Leu Gln Pro Ala Val Val Val Asp Thr Thr Asp
2945 2950 2955

Val Ala Val Thr Val Val Gly Glu Thr Ser Thr Met Thr Thr Gly
2960 2965 2970

Glu Thr Pro Thr Thr Phe Thr Ser Leu Gly Ser Asp Ser Lys Val
2975 2980 2985

Arg Gln Val Leu Lys Leu Gly Val Asp Asp Gly Gln Tyr Pro Gly
2990 2995 3000

Pro Asn Gln Gln Arg Ala Ser Leu Leu Glu Ala Ile Gln Gly Val
3005 3010 3015

Asp Glu Arg Pro Ser Val Leu Ile Leu Gly Ser Asp Lys Ala Thr
3020 3025 3030

Ser Asn Arg Val Lys Thr Ala Lys Asn Val Lys Ile Tyr Arg Ser
3035 3040 3045

Arg Asp Pro Leu Glu Leu Arg Glu Met Met Lys Arg Gly Lys Ile
3050 3055 3060

Leu Val Val Ala Leu Ser Arg Val Asp Thr Ala Leu Leu Lys Phe
3065 3070 3075

Val Asp Tyr Lys Gly Thr Phe Leu Thr Arg Glu Thr Leu Glu Ala
3080 3085 3090

Leu Ser Leu Gly Lys Pro Lys Lys Arg Asp Ile Thr Lys Ala Glu
3095 3100 3105

Ala Gln Trp Leu Leu Arg Leu Glu Asp Gln Ile Glu Glu Leu Pro
3110 3115 3120

Asp Trp Phe Ala Ala Lys Glu Pro Ile Phe Leu Glu Ala Asn Ile
3125 3130 3135

```
Lys Arg  Asp Lys Tyr His Leu  Val Gly Asp Ile Ala  Thr Ile Lys
    3140                 3145                 3150

Glu Lys  Ala Lys Gln Leu Gly  Ala Thr Asp Ser Thr  Lys Ile Ser
    3155                 3160                 3165

Lys Glu  Val Gly Ala Lys Val  Tyr Ser Met Lys Leu  Ser Asn Trp
    3170                 3175                 3180

Val Ile  Gln Glu Glu Asn Lys  Gln Gly Ser Leu Ala  Pro Leu Phe
    3185                 3190                 3195

Glu Glu  Leu Leu Gln Gln Cys  Pro Pro Gly Gly Gln  Asn Lys Thr
    3200                 3205                 3210

Thr His  Met Val Ser Ala Tyr  Gln Leu Ala Gln Gly  Asn Trp Val
    3215                 3220                 3225

Pro Val  Ser Cys His Val Phe  Met Gly Thr Ile Pro  Ala Arg Arg
    3230                 3235                 3240

Thr Lys  Thr His Pro Tyr Glu  Ala Tyr Val Lys Leu  Arg Glu Leu
    3245                 3250                 3255

Val Asp  Glu His Lys Met Lys  Ala Leu Cys Gly Gly  Ser Gly Leu
    3260                 3265                 3270

Ser Lys  His Asn Glu Trp Val  Ile Gly Lys Val Lys  Tyr Gln Gly
    3275                 3280                 3285

Asn Leu  Arg Thr Lys His Met  Leu Asn Pro Gly Lys  Val Ala Glu
    3290                 3295                 3300

Gln Leu  His Arg Glu Gly Tyr  Arg His Asn Val Tyr  Asn Lys Thr
    3305                 3310                 3315

Ile Gly  Ser Val Met Thr Ala  Thr Gly Ile Arg Leu  Glu Lys Leu
    3320                 3325                 3330

Pro Val  Val Arg Ala Gln Thr  Asp Thr Thr Asn Phe  His Gln Ala
    3335                 3340                 3345

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

3350 3355 3360

Leu His Lys Lys Leu Met Glu Val Phe Asn Ala Leu Lys Arg Pro
3365 3370 3375

Glu Leu Glu Ala Ser Tyr Asp Ala Val Asp Trp Glu Glu Leu Glu
3380 3385 3390

Arg Gly Ile Asn Arg Lys Gly Ala Ala Gly Phe Phe Glu Arg Lys
3395 3400 3405

Asn Ile Gly Glu Val Leu Asp Ser Glu Lys Asn Lys Val Glu Glu
3410 3415 3420

Val Ile Asp Ser Leu Lys Lys Gly Arg Asn Ile Arg Tyr Tyr Glu
3425 3430 3435

Thr Ala Ile Pro Lys Asn Glu Lys Arg Asp Val Asn Asp Asp Trp
3440 3445 3450

Thr Ala Gly Asp Phe Val Asp Glu Lys Lys Pro Arg Val Ile Gln
3455 3460 3465

Tyr Pro Glu Ala Lys Thr Arg Leu Ala Ile Thr Lys Val Met Tyr
3470 3475 3480

Lys Trp Val Lys Gln Lys Pro Val Val Ile Pro Gly Tyr Glu Gly
3485 3490 3495

Lys Thr Pro Leu Phe Gln Ile Phe Asp Lys Val Lys Lys Glu Trp
3500 3505 3510

Asp Gln Phe Gln Asn Pro Val Ala Val Ser Phe Asp Thr Lys Ala
3515 3520 3525

Trp Asp Thr Gln Val Thr Thr Arg Asp Leu Glu Leu Ile Arg Asp
3530 3535 3540

Ile Gln Lys Phe Tyr Phe Lys Lys Lys Trp His Lys Phe Ile Asp
3545 3550 3555

Thr Leu Thr Lys His Met Ser Glu Val Pro Val Ile Ser Ala Asp
3560 3565 3570

```
Gly Glu  Val Tyr Ile Arg Lys  Gly Gln Arg Gly Ser  Gly Gln Pro
    3575                 3580                 3585

Asp Thr  Ser Ala Gly Asn Ser  Met Leu Asn Val Leu  Thr Met Val
    3590                 3595                 3600

Tyr Ala  Phe Cys Glu Ala Thr  Gly Val Pro Tyr Lys  Ser Phe Asp
    3605                 3610                 3615

Arg Val  Ala Lys Ile His Val  Cys Gly Asp Asp Gly  Phe Leu Ile
    3620                 3625                 3630

Thr Glu  Arg Ala Leu Gly Glu  Lys Phe Ala Ser Lys  Gly Val Gln
    3635                 3640                 3645

Ile Leu  Tyr Glu Ala Gly Lys  Pro Gln Lys Ile Thr  Glu Gly Asp
    3650                 3655                 3660

Lys Met  Lys Val Ala Tyr Gln  Phe Asp Asp Ile Glu  Phe Cys Ser
    3665                 3670                 3675

His Thr  Pro Val Gln Val Arg  Trp Ser Asp Asn Thr  Ser Ser Tyr
    3680                 3685                 3690

Met Pro  Gly Arg Asn Thr Thr  Thr Ile Leu Ala Lys  Met Ala Thr
    3695                 3700                 3705

Arg Leu  Asp Ser Ser Gly Glu  Arg Gly Thr Ile Ala  Tyr Glu Lys
    3710                 3715                 3720

Ala Val  Ala Phe Ser Phe Leu  Leu Met Tyr Ser Trp  Asn Pro Leu
    3725                 3730                 3735

Ile Arg  Arg Ile Cys Leu Leu  Val Leu Ser Thr Glu  Leu Gln Val
    3740                 3745                 3750

Arg Pro  Gly Lys Ser Thr Thr  Tyr Tyr Tyr Glu Gly  Asp Pro Ile
    3755                 3760                 3765

Ser Ala  Tyr Lys Glu Val Ile  Gly His Asn Leu Phe  Asp Leu Lys
    3770                 3775                 3780

Arg Thr  Ser Phe Glu Lys Leu  Ala Lys Leu Asn Leu  Ser Met Ser
```

```
    3785                3790                3795

Thr Leu  Gly Val Trp Thr Arg  His Thr Ser Lys Arg  Leu Leu Gln
    3800                3805                3810

Asp Cys  Val Asn Val Gly Thr  Lys Glu Gly Asn Trp  Leu Val Asn
    3815                3820                3825

Ala Asp  Arg Leu Val Ser Ser  Lys Thr Gly Asn Arg  Tyr Ile Pro
    3830                3835                3840

Gly Glu  Gly His Thr Leu Gln  Gly Lys His Tyr Glu  Glu Leu Ile
    3845                3850                3855

Leu Ala  Arg Lys Pro Ile Gly  Asn Phe Glu Gly Thr  Asp Arg Tyr
    3860                3865                3870

Asn Leu  Gly Pro Ile Val Asn  Val Val Leu Arg Arg  Leu Lys Ile
    3875                3880                3885

Met Met  Met Ala Leu Ile Gly  Arg Gly Val
    3890                3895
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<211> 3898
<212> PRT
<213> BVDV

<400> 4

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Met Glu Leu Ile Thr Asn Glu Leu Leu Tyr Lys Thr Tyr Lys Gln Lys
1               5                  10                  15

Pro Ala Gly Val Glu Glu Pro Val Tyr Asp Gln Ala Gly Asn Pro Leu
            20                  25                  30

Phe Gly Glu Arg Gly Val Val His Pro Gln Ala Thr Leu Lys Leu Pro
        35                  40                  45

His Lys Arg Gly Glu Ser Glu Val Pro Thr Asn Leu Ala Ser Leu Pro
    50                  55                  60

Lys Arg Gly Asp Cys Arg Ser Gly Asn Ser Lys Gly Pro Val Ser Gly
65                  70                  75                  80
```

```
Ile Tyr Leu Lys Pro Gly Pro Leu Phe Tyr Gln Asp Tyr Lys Gly Pro
                85                  90                  95

Val Tyr His Arg Ala Pro Leu Glu Leu Phe Gln Glu Thr Ser Met Cys
            100                 105                 110

Glu Thr Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Ser Lys Leu
        115                 120                 125

Tyr His Ile Tyr Val Cys Ile Asp Gly Cys Ile Ile Ile Lys Ser Ala
    130                 135                 140

Thr Lys Asp His Gln Lys Val Phe Lys Trp Val His Asn Lys Leu Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Thr Asn Ala Glu Gly Ala
                165                 170                 175

Thr Arg Lys Lys Gln Gln Lys Pro Asp Arg Leu Glu Lys Gly Arg Met
            180                 185                 190

Lys Ile Thr Pro Lys Glu Ser Glu Lys Asp Ser Lys Thr Lys Pro Pro
        195                 200                 205

Asp Ala Thr Ile Val Val Asp Gly Val Lys Tyr Gln Val Lys Lys Lys
    210                 215                 220

Gly Lys Val Lys Ser Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys
225                 230                 235                 240

Asn Lys Pro Gln Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala
                245                 250                 255

Trp Ala Ile Ile Ala Leu Val Leu Phe Asp Ile Ala Val Gly Glu Asn
            260                 265                 270

Ile Thr Gln Trp Asn Leu Gln Asp Asn Gly Thr Glu Gly Ile Gln Arg
        275                 280                 285

Ala Met Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro
    290                 295                 300

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

```
Leu Lys Ala Ile His Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr
                325                 330                 335

Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys
            340                 345                 350

Asn Trp Tyr Asn Ile Glu Pro Trp Ile Leu Leu Met Asn Lys Thr Gln
        355                 360                 365

Ala Asn Leu Thr Glu Gly Gln Pro Pro Arg Glu Cys Ala Val Thr Cys
    370                 375                 380

Arg Tyr Asp Arg Asp Ser Asp Leu Asn Ile Val Thr Gln Ala Arg Asp
385                 390                 395                 400

Ser Pro Thr Pro Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe
                405                 410                 415

Ala Gly Val Leu Val Gln Gly Pro Cys Asn Phe Glu Ile Ala Ala Ser
            420                 425                 430

Asp Val Leu Phe Lys Glu His Asp Cys Thr Gly Met Ile Gln Asp Thr
        435                 440                 445

Ala His Tyr Leu Val Asp Gly Leu Thr Asn Ser Leu Glu Ser Ala Arg
    450                 455                 460

Gln Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Arg Gln Leu Arg Ile
465                 470                 475                 480

Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Thr Trp Phe Gly Ala Tyr
                485                 490                 495

Ala Ala Ser Pro Tyr Cys Glu Val Glu Arg Arg Leu Gly Tyr Ile Trp
            500                 505                 510

Tyr Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile
        515                 520                 525

Val Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Leu Leu
    530                 535                 540
```

```
His Glu Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Val Val
545                 550                 555                 560

Val Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Ile Val Tyr Leu Ile
                565                 570                 575

Leu His Phe Thr Ile Pro Gln Gly His Thr Asp Ile Glu Asp Cys Asp
            580                 585                 590

Lys Asn Gln Leu Asn Leu Thr Val Gly Leu Thr Thr Ala Glu Val Val
        595                 600                 605

Pro Ser Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp
    610                 615                 620

Trp Trp Pro Tyr Glu Thr Ala Thr Val Leu Val Phe Glu Glu Val Gly
625                 630                 635                 640

Gln Val Ile Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Ile
                645                 650                 655

Trp Thr Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Met Val Lys Val
            660                 665                 670

Val Arg Gly Gln Val Leu Gln Gly Ile Leu Trp Leu Met Leu Ile Thr
        675                 680                 685

Gly Ala Gln Gly Tyr Pro Asp Cys Lys Pro Asp Phe Ser Tyr Ala Ile
    690                 695                 700

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

Gln Trp Tyr Lys Tyr Ser Asp Glu Met Arg Leu Gln Asp Thr Val Val
                725                 730                 735

Thr Val Trp Cys Lys Asn Gly Glu Phe Arg His Leu Ile Thr Cys Glu
            740                 745                 750

Arg Glu Ala Arg Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro Thr
        755                 760                 765

Ser Val Val Phe Glu Lys Ile Ile Asn Gly Lys Glu Gln Glu Asp Ile
    770                 775                 780
```

```
Val Glu Met Ser Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp Ala
785                 790                 795                 800

Lys Pro Leu Val Arg Gly Lys Phe Asn Val Thr Leu Leu Asn Gly Pro
                805                 810                 815

Ala Phe Gln Met Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser Cys
            820                 825                 830

Thr Leu Ala Asn Lys Asp Thr Leu Ala Thr Thr Val Val Arg Thr Tyr
        835                 840                 845

Lys Arg Asp Lys Pro Phe Pro Tyr Arg Gln Gly Cys Ile Thr Gln Lys
    850                 855                 860

Thr Ile Gly Glu Asp Leu Tyr Asp Cys Val Leu Gly Gly Asn Trp Thr
865                 870                 875                 880

Cys Val Pro Gly Asn Gln Leu Arg Tyr Val Gly Gly Pro Val Glu Ser
                885                 890                 895

Cys Lys Trp Cys Gly Tyr Lys Phe Asp Lys Ser Glu Gly Leu Pro His
            900                 905                 910

Phe Pro Ile Gly Lys Cys Lys Leu Lys Asn Glu Ser Gly Tyr Arg Gln
        915                 920                 925

Val Asp Glu Thr Ser Cys Asn Arg Asp Gly Val Ala Ile Val Pro Ser
    930                 935                 940

Gly Leu Val Lys Cys Lys Ile Gly Asn Thr Val Val Gln Val Ile Ala
945                 950                 955                 960

Met Asp Asp Lys Leu Gly Pro Met Pro Cys Arg Pro His Glu Ile Ile
                965                 970                 975

Ser Ser Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Ala
            980                 985                 990

Arg Thr Leu Lys Asn Lys Tyr Phe  Glu Pro Arg Asp Asn  Tyr Phe Gln
        995                 1000                1005
```

```
Gln Tyr  Met Leu Lys Gly Glu  Tyr Gln Tyr Trp Phe  Asp Leu Glu
    1010                 1015                 1020

Ile Thr  Asp His His Arg Asp  Tyr Phe Ala Glu Ser  Leu Leu Val
    1025                 1030                 1035

Ile Val  Val Ala Leu Leu Gly  Gly Arg Tyr Val Leu  Trp Leu Leu
    1040                 1045                 1050

Val Thr  Tyr Met Ile Leu Ser  Glu Gln Met Thr Leu  Gly Ala Gln
    1055                 1060                 1065

Tyr Gly  Ala Gly Glu Ile Val  Met Met Gly Asn Leu  Leu Thr His
    1070                 1075                 1080

Asp Ser  Ile Glu Val Val Thr  Tyr Phe Leu Leu Leu  Tyr Leu Leu
    1085                 1090                 1095

Leu Arg  Glu Glu Asn Ile Lys  Lys Trp Val Ile Leu  Ile Tyr His
    1100                 1105                 1110

Ile Ile  Val Met His Pro Leu  Lys Ser Met Thr Val  Ile Leu Leu
    1115                 1120                 1125

Met Val  Gly Gly Met Ala Lys  Ala Glu Pro Asp Thr  Gln Ser Tyr
    1130                 1135                 1140

Leu Glu  Arg Val Asp Leu Ser  Phe Thr Met Ile Thr  Leu Ile Val
    1145                 1150                 1155

Val Gly  Leu Val Ile Ala Arg  Arg Asp Pro Thr Val  Val Pro Leu
    1160                 1165                 1170

Val Thr  Ile Val Ala Ala Leu  Lys Ile Thr Gly Leu  Gly Phe Gly
    1175                 1180                 1185

Pro Gly  Val Asp Val Ala Met  Ala Val Leu Thr Leu  Thr Leu Leu
    1190                 1195                 1200

Met Val  Ser Tyr Val Thr Asp  Tyr Phe Arg Tyr Lys  Arg Trp Leu
    1205                 1210                 1215

Gln Cys  Ile Leu Ser Leu Val  Ala Gly Val Phe Leu  Ile Arg Ser
    1220                 1225                 1230
```

```
Leu Lys  His Leu Gly Glu Ile  Glu Thr Pro Glu Leu  Thr Ile Pro
    1235                 1240                 1245

Asn Trp  Arg Pro Leu Thr Phe  Ile Leu Leu Tyr Leu  Thr Ser Ala
    1250                 1255                 1260

Thr Val  Val Thr Arg Trp Lys  Val Asp Ile Ala Gly  Ile Leu Leu
    1265                 1270                 1275

Gln Gly  Ala Pro Ile Leu Leu  Leu Ile Ala Thr Leu  Trp Ala Asp
    1280                 1285                 1290

Phe Leu  Thr Leu Val Leu Ile  Leu Pro Thr Tyr Glu  Leu Val Lys
    1295                 1300                 1305

Leu Tyr  Tyr Leu Lys Asn Ile  Lys Thr Asp Val Glu  Arg Ser Trp
    1310                 1315                 1320

Leu Gly  Gly Leu Asp Tyr Lys  Thr Ile Asp Ser Val  Tyr Asp Val
    1325                 1330                 1335

Asp Glu  Ser Gly Glu Gly Val  Tyr Leu Phe Pro Ser  Arg Gln Asp
    1340                 1345                 1350

Gly Lys  Lys Asn Thr Ser Ile  Leu Leu Pro Leu Ile  Arg Ala Thr
    1355                 1360                 1365

Leu Ile  Ser Cys Val Ser Ser  Lys Trp Gln Met Val  Tyr Met Ala
    1370                 1375                 1380

Tyr Leu  Thr Leu Asp Phe Met  Tyr Tyr Met His Arg  Lys Val Ile
    1385                 1390                 1395

Glu Glu  Ile Ser Gly Gly Thr  Asn Val Ile Ser Arg  Val Ile Ala
    1400                 1405                 1410

Ala Leu  Ile Glu Leu Asn Trp  Ser Met Glu Glu Glu  Glu Ser Lys
    1415                 1420                 1425

Gly Leu  Lys Lys Phe Phe Val  Leu Ser Gly Arg Val  Arg Asn Leu
    1430                 1435                 1440
```

```
Ile Ile  Lys His Lys Val Arg  Asn Gln Thr Val Ala  Ser Trp Tyr
    1445                 1450                 1455

Gly Glu  Glu Glu Val Tyr Gly  Leu Pro Lys Val Val  Thr Ile Ile
    1460                 1465                 1470

Arg Ala  Cys Thr Leu Asn Lys  Asn Lys His Cys Ile  Ile Cys Thr
    1475                 1480                 1485

Val Cys  Glu Ala Lys Lys Trp  Lys Gly Gly Asn Cys  Pro Lys Cys
    1490                 1495                 1500

Gly Arg  His Gly Lys Pro Ile  Thr Cys Gly Met Thr  Leu Ala Asp
    1505                 1510                 1515

Phe Glu  Glu Arg His Tyr Lys  Arg Ile Phe Ile Arg  Glu Gly Thr
    1520                 1525                 1530

Phe Glu  Gly Pro Phe Arg Gln  Glu Tyr Asn Gly Phe  Val Gln Tyr
    1535                 1540                 1545

Ala Ala  Arg Gly Gln Leu Phe  Leu Arg Asn Leu Pro  Ile Leu Ala
    1550                 1555                 1560

Thr Lys  Val Lys Met Leu Met  Val Gly Asn Leu Gly  Glu Glu Ile
    1565                 1570                 1575

Gly Asp  Leu Glu His Leu Gly  Trp Ile Leu Arg Gly  Pro Ala Val
    1580                 1585                 1590

Cys Lys  Lys Ile Thr Glu His  Glu Lys Cys His Val  Ser Ile Leu
    1595                 1600                 1605

Asp Lys  Leu Thr Ala Phe Phe  Gly Val Met Pro Arg  Gly Thr Thr
    1610                 1615                 1620

Pro Arg  Ala Pro Val Arg Phe  Pro Thr Ala Leu Leu  Lys Val Arg
    1625                 1630                 1635

Arg Gly  Leu Glu Thr Gly Trp  Ala Tyr Thr His Gln  Gly Gly Ile
    1640                 1645                 1650

Ser Ser  Val Asp His Val Thr  Ala Gly Lys Asp Leu  Leu Val Cys
    1655                 1660                 1665
```

```
Asp Ser  Met Gly Arg Thr Arg  Val Val Cys Gln Ser  Asn Asn Lys
    1670                 1675                 1680

Leu Thr  Asp Glu Thr Glu Tyr  Gly Val Lys Thr Asp  Ser Gly Cys
    1685                 1690                 1695

Pro Asp  Gly Ala Arg Cys Tyr  Val Leu Asn Pro Glu  Ala Val Asn
    1700                 1705                 1710

Ile Ser  Gly Ser Lys Gly Ala  Val Val His Leu Gln  Lys Thr Gly
    1715                 1720                 1725

Gly Glu  Phe Thr Cys Val Thr  Ala Ser Gly Thr Pro  Ala Phe Phe
    1730                 1735                 1740

Asp Leu  Lys Asn Leu Lys Gly  Trp Ser Gly Leu Pro  Ile Tyr Glu
    1745                 1750                 1755

Ala Ser  Ser Gly Arg Val Val  Gly Arg Val Lys Val  Gly Lys Asn
    1760                 1765                 1770

Glu Glu  Ser Lys Pro Thr Lys  Leu Met Ser Gly Ile  Gln Thr Val
    1775                 1780                 1785

Ser Lys  Ser Thr Ala Asp Leu  Thr Glu Met Val Lys  Lys Ile Thr
    1790                 1795                 1800

Ser Met  Asn Arg Gly Asp Phe  Lys Gln Ile Thr Leu  Ala Thr Gly
    1805                 1810                 1815

Ala Gly  Lys Thr Thr Glu Leu  Pro Lys Ala Val Ile  Glu Glu Ile
    1820                 1825                 1830

Gly Arg  His Lys Arg Val Leu  Val Leu Ile Pro Leu  Arg Ala Ala
    1835                 1840                 1845

Ala Glu  Ser Val Tyr Gln Tyr  Met Arg Leu Lys His  Pro Ser Ile
    1850                 1855                 1860

Ser Phe  Asn Leu Arg Ile Gly  Asp Met Lys Glu Gly  Asp Met Ala
    1865                 1870                 1875
```

```
Thr Gly  Ile Thr Tyr Ala Ser  Tyr Gly Tyr Phe Cys  Gln Met Gln
    1880                 1885                 1890

Gln Pro  Lys Leu Arg Ala Ala  Met Val Glu Tyr Ser  Tyr Ile Phe
    1895                 1900                 1905

Leu Asp  Glu Tyr His Cys Ala  Thr Pro Glu Gln Leu  Ala Val Ile
    1910                 1915                 1920

Gly Lys  Ile His Arg Phe Ser  Glu Ser Ile Arg Val  Val Ala Met
    1925                 1930                 1935

Thr Ala  Thr Pro Ala Gly Ser  Val Thr Thr Thr Gly  Gln Lys His
    1940                 1945                 1950

Pro Ile  Glu Glu Phe Ile Ala  Pro Glu Val Met Lys  Gly Glu Asp
    1955                 1960                 1965

Leu Gly  Ser Gln Phe Leu Asp  Ile Ala Gly Leu Lys  Ile Pro Val
    1970                 1975                 1980

Glu Glu  Met Lys Gly Asn Met  Leu Val Phe Val Pro  Thr Arg Asn
    1985                 1990                 1995

Met Ala  Val Asp Val Ala Lys  Lys Leu Lys Ala Lys  Gly Tyr Asn
    2000                 2005                 2010

Ser Gly  Tyr Tyr Tyr Ser Gly  Glu Asp Pro Ala Asn  Leu Arg Val
    2015                 2020                 2025

Val Thr  Ser Gln Ser Pro Tyr  Val Val Val Ala Thr  Asn Ala Ile
    2030                 2035                 2040

Glu Ser  Gly Val Thr Leu Pro  Asp Leu Asp Thr Val  Val Asp Thr
    2045                 2050                 2055

Gly Leu  Lys Cys Glu Lys Arg  Val Arg Val Ser Ser  Lys Ile Pro
    2060                 2065                 2070

Phe Ile  Val Thr Gly Leu Lys  Arg Met Ala Val Thr  Val Gly Glu
    2075                 2080                 2085

Gln Ala  Gln Arg Arg Gly Arg  Val Gly Arg Val Lys  Pro Gly Arg
    2090                 2095                 2100
```

```
Tyr Tyr  Arg Ser Gln Glu Thr  Ala Thr Gly Ser Lys  Asp Tyr His
    2105                 2110                 2115

Tyr Asp  Leu Leu Gln Ala Gln  Arg Tyr Gly Ile Glu  Asp Gly Ile
    2120                 2125                 2130

Asn Ile  Thr Lys Ser Phe Arg  Glu Met Asn Tyr Asp  Trp Ser Leu
    2135                 2140                 2145

Tyr Glu  Glu Asp Ser Leu Leu  Ile Thr Gln Leu Glu  Ile Leu Asn
    2150                 2155                 2160

Asn Leu  Leu Ile Ser Glu Asp  Leu Pro Ala Ala Val  Lys Asn Ile
    2165                 2170                 2175

Met Ala  Arg Thr Asp His Pro  Glu Pro Ile Gln Leu  Ala Tyr Asn
    2180                 2185                 2190

Ser Tyr  Glu Val Gln Val Pro  Val Leu Phe Pro Lys  Ile Arg Asn
    2195                 2200                 2205

Gly Glu  Val Thr Asp Thr Tyr  Glu Asn Tyr Ser Phe  Leu Asn Ala
    2210                 2215                 2220

Arg Lys  Leu Gly Glu Asp Val  Pro Thr Tyr Ile Tyr  Ala Thr Glu
    2225                 2230                 2235

Asp Glu  Asp Leu Ala Val Asp  Leu Leu Gly Leu Asp  Trp Pro Asp
    2240                 2245                 2250

Pro Gly  Asn Gln Gln Val Val  Glu Thr Gly Lys Ala  Leu Lys Gln
    2255                 2260                 2265

Val Val  Gly Leu Ser Ser Ala  Glu Asn Ala Leu Leu  Ile Ala Leu
    2270                 2275                 2280

Phe Gly  Tyr Val Gly Tyr Gln  Ala Leu Ser Lys Arg  His Val Pro
    2285                 2290                 2295

Met Ile  Thr Asp Ile Tyr Thr  Ile Glu Asp Gln Arg  Leu Glu Asp
    2300                 2305                 2310
```

```
Thr Thr  His Leu Gln Tyr Ala  Pro Asn Ala Ile Arg  Thr Glu Gly
    2315                 2320                 2325

Lys Glu  Thr Glu Leu Lys Glu  Leu Ala Val Gly Asp  Leu Asp Lys
    2330                 2335                 2340

Ile Met  Gly Ser Ile Ser Asp  Tyr Ala Ser Gly Gly  Leu Glu Phe
    2345                 2350                 2355

Val Arg  Ser Gln Ala Glu Lys  Ile Arg Ser Ala Pro  Thr Phe Lys
    2360                 2365                 2370

Glu Asn  Val Glu Thr Ala Lys  Gly Tyr Val Gln Lys  Phe Ile Asp
    2375                 2380                 2385

Ala Leu  Ile Glu Asn Lys Glu  Thr Ile Ile Arg Tyr  Gly Leu Trp
    2390                 2395                 2400

Gly Thr  His Thr Ala Leu Tyr  Lys Ser Ile Ala Ala  Arg Leu Gly
    2405                 2410                 2415

His Glu  Thr Ala Phe Ala Thr  Leu Val Val Lys Trp  Leu Ala Phe
    2420                 2425                 2430

Gly Gly  Glu Ser Val Ser Asp  His Val Arg Gln Ala  Ala Val Asp
    2435                 2440                 2445

Leu Val  Val Tyr Tyr Val Met  Asn Lys Pro Ser Phe  Pro Gly Asp
    2450                 2455                 2460

Ser Glu  Thr Gln Gln Glu Gly  Arg Arg Phe Val Ala  Ser Leu Phe
    2465                 2470                 2475

Ile Ser  Ala Leu Ala Thr Tyr  Thr Tyr Lys Ser Trp  Asn Tyr His
    2480                 2485                 2490

Asn Leu  Ser Lys Val Val Glu  Pro Ala Leu Ala Tyr  Leu Pro Tyr
    2495                 2500                 2505

Ala Thr  Ser Ala Leu Lys Met  Phe Thr Pro Thr Arg  Leu Glu Ser
    2510                 2515                 2520

Val Val  Ile Leu Ser Thr Thr  Ile Tyr Lys Thr Tyr  Leu Ser Ile
    2525                 2530                 2535
```

```
Arg Lys  Gly Lys Ser Asp Gly  Leu Leu Gly Thr Gly  Ile Ser Ala
    2540                 2545                 2550

Ala Met  Glu Ile Leu Ser Gln  Asn Pro Val Ser Val  Gly Ile Ser
    2555                 2560                 2565

Val Met  Leu Gly Val Gly Ala  Ile Ala Ala His Asn  Ala Ile Glu
    2570                 2575                 2580

Ser Ser  Glu Gln Lys Arg Thr  Leu Leu Met Lys Val  Phe Val Lys
    2585                 2590                 2595

Asn Phe  Leu Asp Gln Ala Ala  Thr Asp Glu Leu Val  Lys Glu Asn
    2600                 2605                 2610

Pro Glu  Lys Ile Ile Met Ala  Leu Phe Glu Ala Val  Gln Thr Ile
    2615                 2620                 2625

Gly Asn  Pro Leu Arg Leu Ile  Tyr His Leu Tyr Gly  Val Tyr Tyr
    2630                 2635                 2640

Lys Gly  Trp Glu Ala Lys Glu  Leu Ser Glu Arg Thr  Ala Gly Arg
    2645                 2650                 2655

Asn Leu  Phe Thr Leu Ile Met  Phe Glu Ala Phe Glu  Leu Leu Gly
    2660                 2665                 2670

Met Asp  Ser Glu Gly Lys Ile  Arg Asn Leu Ser Gly  Asn Tyr Ile
    2675                 2680                 2685

Leu Asp  Leu Ile Tyr Ser Leu  His Lys Gln Ile Asn  Arg Gly Leu
    2690                 2695                 2700

Lys Lys  Ile Val Leu Gly Trp  Ala Pro Ala Pro Phe  Ser Cys Asp
    2705                 2710                 2715

Trp Thr  Pro Ser Asp Gly Arg  Ile Arg Leu Pro Thr  Asp Asn Tyr
    2720                 2725                 2730

Leu Arg  Val Glu Thr Lys Cys  Pro Cys Gly Tyr Glu  Met Lys Ala
    2735                 2740                 2745
```

```
Leu Arg  Asn Val Ser Gly Ser  Leu Thr Lys Val Glu  Glu Lys Gly
    2750                 2755                 2760

Pro Phe  Leu Cys Arg Asn Arg  Pro Gly Arg Gly Pro  Val Asn Tyr
    2765                 2770                 2775

Arg Val  Thr Lys Tyr Tyr Asp  Asp Asn Leu Thr Glu  Ile Lys Pro
    2780                 2785                 2790

Val Ala  Lys Leu Glu Gly Leu  Val Glu His Tyr Tyr  Lys Gly Val
    2795                 2800                 2805

Thr Ala  Arg Ile Asp Tyr Asp  Lys Gly Lys Met Leu  Val Ala Thr
    2810                 2815                 2820

Asp Lys  Trp Glu Val Glu His  Gly Thr Val Thr Arg  Leu Ala Lys
    2825                 2830                 2835

Arg Tyr  Ser Gly Val Gly Phe  Lys Gly Ala Tyr Leu  Gly Asp Glu
    2840                 2845                 2850

Pro Asn  Tyr Arg Asp Leu Val  Glu Arg Asp Cys Ala  Thr Ile Thr
    2855                 2860                 2865

Lys Asn  Thr Val Gln Phe Leu  Lys Met Lys Lys Gly  Cys Ala Phe
    2870                 2875                 2880

Thr Tyr  Asp Leu Thr Leu Ser  Asn Leu Thr Arg Leu  Ile Glu Leu
    2885                 2890                 2895

Val His  Arg Asn Asn Leu Glu  Glu Lys Asp Ile Pro  Ala Ala Thr
    2900                 2905                 2910

Val Thr  Thr Trp Leu Ala Tyr  Thr Phe Val Asn Glu  Asp Val Gly
    2915                 2920                 2925

Thr Ile  Arg Pro Val Leu Gly  Glu Arg Val Ile Ala  Asp Pro Val
    2930                 2935                 2940

Val Asp  Val Asn Leu Gln Pro  Glu Val Gln Val Asp  Thr Ser Glu
    2945                 2950                 2955

Val Gly  Ile Thr Leu Val Gly  Lys Ala Ala Leu Met  Thr Thr Gly
    2960                 2965                 2970
```

```
Thr Thr  Pro Val Val Glu Lys  Thr Glu Pro Ser Ala  Ser Ala Ser
    2975                 2980                 2985

Pro Ser  Ser Ile Lys Ile Gly  Leu Asp Gln Gly Ser  Tyr Pro Gly
    2990                 2995                 3000

Pro Gly  Leu Gln Asp Arg Thr  Leu Val Asp Glu Ile  His Ser Lys
    3005                 3010                 3015

Asp Glu  Arg Pro Phe Val Leu  Val Leu Gly Ser Lys  Asn Ser Met
    3020                 3025                 3030

Ser Asn  Arg Ala Lys Thr Ala  Lys Asn Ile Asn Leu  Tyr Thr Gly
    3035                 3040                 3045

Lys Asp  Pro Arg Glu Ile Arg  Asp Leu Met Ala Gln  Gly Arg Met
    3050                 3055                 3060

Leu Val  Val Ala Leu Arg Gly  Phe Asn Pro Glu Leu  Ser Glu Leu
    3065                 3070                 3075

Val Asp  Phe Lys Gly Thr Phe  Leu Asp Arg Glu Ala  Leu Glu Ala
    3080                 3085                 3090

Leu Ser  Leu Gly Arg Pro Arg  Pro Lys Gln Val Thr  Thr Ser Thr
    3095                 3100                 3105

Val Arg  Glu Leu Leu Glu Gln  Glu Glu Gln Val Glu  Val Pro Asn
    3110                 3115                 3120

Trp Phe  Gly Ala Asp Asp Pro  Val Phe Leu Glu Val  Ala Leu Lys
    3125                 3130                 3135

Gly Asp  Lys Tyr His Leu Val  Gly Asp Val Asp Lys  Val Lys Asp
    3140                 3145                 3150

Gln Ala  Lys Gly Leu Gly Ala  Thr Asp Gln Thr Arg  Ile Val Lys
    3155                 3160                 3165

Glu Val  Gly Ala Arg Thr Tyr  Thr Met Lys Leu Ser  Ser Trp Phe
    3170                 3175                 3180
```

```
Leu Gln  Ala Ser Asn Lys Gln  Met Ser Leu Thr Pro  Leu Phe Glu
    3185                 3190                 3195

Glu Leu  Leu Leu Arg Cys Pro  Pro Lys Ala Lys Asn  Asn Lys Gly
    3200                 3205                 3210

His Met  Ala Ser Ala Tyr Gln  Leu Ala Gln Gly Asn  Trp Glu Pro
    3215                 3220                 3225

Leu Asp  Cys Gly Val Tyr Leu  Gly Thr Ile Pro Ala  Arg Arg Val
    3230                 3235                 3240

Lys Ile  His Pro Tyr Glu Ala  Tyr Leu Lys Leu Lys  Asp Leu Leu
    3245                 3250                 3255

Glu Glu  Glu Glu Lys Lys Pro  Lys Ser Arg Asp Thr  Val Ile Arg
    3260                 3265                 3270

Glu His  Asn Lys Trp Ile Leu  Lys Lys Val Arg His  Gln Gly Asn
    3275                 3280                 3285

Leu Asn  Thr Lys Lys Ile Leu  Asn Pro Gly Lys Leu  Ser Glu Gln
    3290                 3295                 3300

Leu Asp  Arg Glu Gly His Lys  Arg Asn Ile Tyr Asn  Asn Gln Ile
    3305                 3310                 3315

Gly Thr  Ile Leu Thr Gly Ala  Gly Val Arg Leu Glu  Lys Leu Pro
    3320                 3325                 3330

Val Val  Arg Ala Gln Thr Asp  Thr Lys Ser Phe His  Glu Ala Ile
    3335                 3340                 3345

Arg Asp  Lys Ile Asp Lys Asn  Glu Asn Gln Gln Ser  Pro Gly Leu
    3350                 3355                 3360

His Gly  Lys Leu Leu Glu Ile  Phe His Thr Ile Ala  Gln Pro Ser
    3365                 3370                 3375

Leu Arg  His Thr Tyr Gly Glu  Val Thr Trp Glu Gln  Leu Glu Ala
    3380                 3385                 3390

Gly Ile  Asn Arg Lys Gly Ala  Ala Gly Phe Leu Glu  Lys Lys Asn
    3395                 3400                 3405
```

```
Val Gly  Glu Val Leu Asp Ser  Glu Lys His Leu Val  Glu Gln Leu
    3410                 3415                 3420

Ile Arg  Asp Leu Lys Ala Gly  Arg Lys Ile Arg Tyr  Tyr Glu Thr
    3425                 3430                 3435

Ala Ile  Pro Lys Asn Glu Lys  Arg Asp Val Ser Asp  Asp Trp Gln
    3440                 3445                 3450

Ala Gly  Asp Leu Val Asp Glu  Lys Lys Pro Arg Val  Ile Gln Tyr
    3455                 3460                 3465

Pro Glu  Ala Lys Thr Arg Leu  Ala Ile Thr Lys Val  Met Tyr Asn
    3470                 3475                 3480

Trp Val  Lys Gln Gln Pro Val  Val Ile Pro Gly Tyr  Glu Gly Lys
    3485                 3490                 3495

Thr Pro  Leu Phe Asn Ile Phe  Asn Lys Val Arg Lys  Glu Trp Asp
    3500                 3505                 3510

Leu Phe  Asn Glu Pro Val Ala  Val Ser Phe Asp Thr  Lys Ala Trp
    3515                 3520                 3525

Asp Thr  Gln Val Thr Ser Lys  Asp Leu Arg Leu Ile  Gly Glu Ile
    3530                 3535                 3540

Gln Lys  Tyr Tyr Tyr Arg Lys  Glu Trp His Lys Phe  Ile Asp Thr
    3545                 3550                 3555

Ile Thr  Asp His Met Val Glu  Val Pro Val Ile Thr  Ala Asp Gly
    3560                 3565                 3570

Glu Val  Tyr Ile Arg Asn Gly  Gln Arg Gly Ser Gly  Gln Pro Asp
    3575                 3580                 3585

Thr Ser  Ala Gly Asn Ser Met  Leu Asn Val Leu Thr  Met Met Tyr
    3590                 3595                 3600

Ala Phe  Cys Glu Ser Thr Gly  Ile Pro Tyr Lys Ser  Phe Asn Arg
    3605                 3610                 3615
```

```
Val Ala  Arg Ile His Val Cys  Gly Asp Asp Gly Phe  Leu Ile Thr
    3620                 3625                 3630

Glu Arg  Gly Leu Gly Leu Lys  Phe Ala Asn Asn Gly  Met Gln Ile
    3635                 3640                 3645

Leu His  Glu Ala Gly Lys Pro  Gln Lys Ile Thr Glu  Gly Glu Arg
    3650                 3655                 3660

Met Lys  Val Ala Tyr Arg Phe  Glu Asp Ile Glu Phe  Cys Ser His
    3665                 3670                 3675

Thr Pro  Val Pro Val Arg Trp  Ser Asp Asn Thr Ser  Ser Tyr Met
    3680                 3685                 3690

Ala Gly  Arg Asp Thr Ala Ile  Ile Leu Ser Lys Met  Ala Thr Arg
    3695                 3700                 3705

Leu Asp  Ser Ser Gly Glu Arg  Gly Thr Thr Ala Tyr  Glu Lys Ala
    3710                 3715                 3720

Val Ala  Phe Ser Phe Leu Leu  Met Tyr Ser Trp Asn  Pro Leu Val
    3725                 3730                 3735

Arg Arg  Ile Cys Leu Leu Val  Leu Ser Gln Gln Pro  Glu Thr Ala
    3740                 3745                 3750

Pro Ser  Thr Gln Thr Thr Tyr  Tyr Tyr Lys Gly Asp  Pro Ile Gly
    3755                 3760                 3765

Ala Tyr  Lys Asp Val Ile Gly  Lys Asn Leu Ser Glu  Leu Lys Arg
    3770                 3775                 3780

Thr Gly  Phe Glu Lys Leu Ala  Asn Leu Asn Leu Ser  Leu Ser Thr
    3785                 3790                 3795

Leu Gly  Ile Trp Ser Lys His  Thr Ser Lys Arg Ile  Ile Gln Asp
    3800                 3805                 3810

Cys Val  Thr Ile Gly Lys Glu  Glu Gly Asn Trp Leu  Val Asn Ala
    3815                 3820                 3825

Asp Arg  Leu Ile Ser Ser Lys  Thr Gly His Leu Tyr  Ile Pro Asp
    3830                 3835                 3840
```

```
Lys Gly  Tyr Thr Leu Gln Gly  Lys His Tyr Glu Gln  Leu Gln Leu
    3845                 3850                 3855

Gln Ala  Arg Thr Ser Pro Ile  Met Gly Val Gly Thr  Glu Arg Tyr
    3860                 3865                 3870

Lys Leu  Gly Pro Ile Val Asn  Leu Leu Leu Arg Arg  Leu Lys Val
    3875                 3880                 3885

Leu Leu  Met Ala Ala Val Gly  Ala Ser Ser
    3890                 3895
```

<210> 5
<211> 3897
<212> PRT
<213> BVDV

<400> 5

```
Met Glu Leu Ile Thr Asn Glu Leu Leu Tyr Lys Thr Tyr Lys Gln Lys
1               5                  10                  15

Pro Ala Gly Val Glu Glu Pro Val Tyr Asp Gln Ala Gly Asn Pro Leu
            20                  25                  30

Phe Gly Glu Arg Gly Val Val His Pro Gln Ala Thr Leu Lys Leu Pro
        35                  40                  45

His Lys Arg Gly Glu Ser Glu Val Pro Thr Asn Leu Ala Ser Leu Pro
    50                  55                  60

Lys Arg Gly Asp Cys Arg Ser Gly Asn Ser Lys Gly Pro Val Ser Gly
65                  70                  75                  80

Ile Tyr Leu Lys Pro Gly Pro Leu Phe Tyr Gln Asp Tyr Lys Gly Pro
                85                  90                  95

Val Tyr His Arg Ala Pro Leu Glu Leu Phe Gln Glu Thr Ser Met Cys
            100                 105                 110

Glu Thr Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Ser Lys Leu
        115                 120                 125

Tyr His Ile Tyr Val Cys Ile Asp Gly Cys Ile Ile Ile Lys Ser Ala
```

```
    130                 135                 140

Thr Lys Asp His Gln Lys Val Phe Lys Trp Val His Asn Lys Leu Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Thr Asn Ala Glu Gly Ala
                165                 170                 175

Thr Arg Lys Lys Gln Gln Lys Pro Asp Arg Leu Glu Lys Gly Arg Met
            180                 185                 190

Lys Ile Thr Pro Lys Glu Ser Glu Lys Asp Ser Lys Thr Lys Pro Pro
        195                 200                 205

Asp Ala Thr Ile Val Val Asp Gly Val Lys Tyr Gln Val Lys Lys Lys
    210                 215                 220

Gly Lys Val Lys Ser Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys
225                 230                 235                 240

Asn Lys Pro Gln Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala
                245                 250                 255

Trp Ala Ile Ile Ala Leu Val Leu Phe Asp Ile Ala Val Gly Glu Asn
            260                 265                 270

Ile Thr Gln Trp Asn Leu Gln Asp Asn Gly Thr Glu Gly Ile Gln Arg
        275                 280                 285

Ala Met Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro
    290                 295                 300

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

Leu Lys Ala Ile His Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr
                325                 330                 335

Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys
            340                 345                 350

Asn Trp Tyr Asn Ile Glu Pro Trp Ile Leu Leu Met Asn Lys Thr Gln
        355                 360                 365
```

```
Ala Asn Leu Thr Glu Gly Gln Pro Pro Arg Glu Cys Ala Val Thr Cys
    370                 375                 380

Arg Tyr Asp Arg Asp Ser Asp Leu Asn Ile Val Thr Gln Ala Arg Asp
385                 390                 395                 400

Ser Pro Thr Pro Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe
                405                 410                 415

Ala Gly Val Leu Val Gln Gly Pro Cys Asn Phe Glu Ile Ala Ala Ser
            420                 425                 430

Asp Val Leu Phe Lys Glu His Asp Thr Gly Met Ile Gln Asp Thr Ala
        435                 440                 445

His Tyr Leu Val Asp Gly Leu Thr Asn Ser Leu Glu Ser Ala Arg Gln
    450                 455                 460

Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Arg Gln Leu Arg Ile Leu
465                 470                 475                 480

Gly Lys Lys Leu Glu Asn Lys Ser Lys Thr Trp Phe Gly Ala Tyr Ala
                485                 490                 495

Ala Ser Pro Tyr Cys Glu Val Glu Arg Arg Leu Gly Tyr Ile Trp Tyr
            500                 505                 510

Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Val
        515                 520                 525

Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Leu Leu His
    530                 535                 540

Glu Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Val Val Val
545                 550                 555                 560

Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Ile Val Tyr Leu Ile Leu
                565                 570                 575

His Phe Thr Ile Pro Gln Gly His Thr Asp Ile Glu Asp Cys Asp Lys
            580                 585                 590

Asn Gln Leu Asn Leu Thr Val Gly Leu Thr Thr Ala Glu Val Val Pro
```

595 600 605

Ser Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp Trp
610 615 620

Trp Pro Tyr Glu Thr Ala Thr Val Leu Val Phe Glu Glu Val Gly Gln
625 630 635 640

Val Ile Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Ile Trp
645 650 655

Thr Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Met Val Lys Val Val
660 665 670

Arg Gly Gln Val Leu Gln Gly Ile Leu Trp Leu Met Leu Ile Thr Gly
675 680 685

Ala Gln Gly Tyr Pro Asp Cys Lys Pro Asp Phe Ser Tyr Ala Ile Ala
690 695 700

Lys Asn Asp Glu Ile Gly Pro Leu Gly Ala Thr Gly Leu Thr Thr Gln
705 710 715 720

Trp Tyr Lys Tyr Ser Asp Glu Met Arg Leu Gln Asp Thr Val Val Thr
725 730 735

Val Trp Cys Lys Asn Gly Glu Phe Arg His Leu Ile Thr Cys Glu Arg
740 745 750

Glu Ala Arg Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro Thr Ser
755 760 765

Val Val Phe Glu Lys Ile Ile Asn Gly Lys Glu Gln Glu Asp Ile Val
770 775 780

Glu Met Ser Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp Ala Lys
785 790 795 800

Pro Leu Val Arg Gly Lys Phe Asn Val Thr Leu Leu Asn Gly Pro Ala
805 810 815

Phe Gln Met Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser Cys Thr
820 825 830

```
Leu Ala Asn Lys Asp Thr Leu Ala Thr Thr Val Val Arg Thr Tyr Lys
        835                 840                 845

Arg Asp Lys Pro Phe Pro Tyr Arg Gln Gly Cys Ile Thr Gln Lys Thr
    850                 855                 860

Ile Gly Glu Asp Leu Tyr Asp Cys Val Leu Gly Gly Asn Trp Thr Cys
865                 870                 875                 880

Val Pro Gly Asn Gln Leu Arg Tyr Val Gly Gly Pro Val Glu Ser Cys
                885                 890                 895

Lys Trp Cys Gly Tyr Lys Phe Asp Lys Ser Glu Gly Leu Pro His Phe
            900                 905                 910

Pro Ile Gly Lys Cys Lys Leu Lys Asn Glu Ser Gly Tyr Arg Gln Val
        915                 920                 925

Asp Glu Thr Ser Cys Asn Arg Asp Gly Val Ala Ile Val Pro Ser Gly
    930                 935                 940

Leu Val Lys Cys Lys Ile Gly Asn Thr Val Val Gln Val Ile Ala Met
945                 950                 955                 960

Asp Asp Lys Leu Gly Pro Met Pro Cys Arg Pro His Glu Ile Ile Ser
                965                 970                 975

Ser Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Ala Arg
            980                 985                 990

Thr Leu Lys Asn Lys Tyr Phe Glu  Pro Arg Asp Asn Tyr  Phe Gln Gln
        995                 1000                1005

Tyr Met  Leu Lys Gly Glu Tyr  Gln Tyr Trp Phe Asp  Leu Glu Ile
    1010                1015                1020

Thr Asp  His His Arg Asp Tyr  Phe Ala Glu Ser Leu  Leu Val Ile
    1025                1030                1035

Val Val  Ala Leu Leu Gly Gly  Arg Tyr Val Leu Trp  Leu Leu Val
    1040                1045                1050

Thr Tyr  Met Ile Leu Ser Glu  Gln Met Thr Leu Gly  Ala Gln Tyr
```

1055 1060 1065

Gly Ala Gly Glu Ile Val Met Met Gly Asn Leu Leu Thr His Asp
1070 1075 1080

Ser Ile Glu Val Val Thr Tyr Phe Leu Leu Leu Tyr Leu Leu Leu
1085 1090 1095

Arg Glu Glu Asn Ile Lys Lys Trp Val Ile Leu Ile Tyr His Ile
1100 1105 1110

Ile Val Met His Pro Leu Lys Ser Met Thr Val Ile Leu Leu Met
1115 1120 1125

Val Gly Gly Met Ala Lys Ala Glu Pro Asp Thr Gln Ser Tyr Leu
1130 1135 1140

Glu Arg Val Asp Leu Ser Phe Thr Met Ile Thr Leu Ile Val Val
1145 1150 1155

Gly Leu Val Ile Ala Arg Arg Asp Pro Thr Val Val Pro Leu Val
1160 1165 1170

Thr Ile Val Ala Ala Leu Lys Ile Thr Gly Leu Gly Phe Gly Pro
1175 1180 1185

Gly Val Asp Val Ala Met Ala Val Leu Thr Leu Thr Leu Leu Met
1190 1195 1200

Val Ser Tyr Val Thr Asp Tyr Phe Arg Tyr Lys Arg Trp Leu Gln
1205 1210 1215

Cys Ile Leu Ser Leu Val Ala Gly Val Phe Leu Ile Arg Ser Leu
1220 1225 1230

Lys His Leu Gly Glu Ile Glu Thr Pro Glu Leu Thr Ile Pro Asn
1235 1240 1245

Trp Arg Pro Leu Thr Phe Ile Leu Leu Tyr Leu Thr Ser Ala Thr
1250 1255 1260

Val Val Thr Arg Trp Lys Val Asp Ile Ala Gly Ile Leu Leu Gln
1265 1270 1275

```
Gly Ala  Pro Ile Leu Leu Leu  Ile Ala Thr Leu Trp  Ala Asp Phe
    1280                 1285                 1290

Leu Thr  Leu Val Leu Ile Leu  Pro Thr Tyr Glu Leu  Val Lys Leu
    1295                 1300                 1305

Tyr Tyr  Leu Lys Asn Ile Lys  Thr Asp Val Glu Arg  Ser Trp Leu
    1310                 1315                 1320

Gly Gly  Leu Asp Tyr Lys Thr  Ile Asp Ser Val Tyr  Asp Val Asp
    1325                 1330                 1335

Glu Ser  Gly Glu Gly Val Tyr  Leu Phe Pro Ser Arg  Gln Asp Gly
    1340                 1345                 1350

Lys Lys  Asn Thr Ser Ile Leu  Leu Pro Leu Ile Arg  Ala Thr Leu
    1355                 1360                 1365

Ile Ser  Cys Val Ser Ser Lys  Trp Gln Met Val Tyr  Met Ala Tyr
    1370                 1375                 1380

Leu Thr  Leu Asp Phe Met Tyr  Tyr Met His Arg Lys  Val Ile Glu
    1385                 1390                 1395

Glu Ile  Ser Gly Gly Thr Asn  Val Ile Ser Arg Val  Ile Ala Ala
    1400                 1405                 1410

Leu Ile  Glu Leu Asn Trp Ser  Met Glu Glu Glu Glu  Ser Lys Gly
    1415                 1420                 1425

Leu Lys  Lys Phe Phe Val Leu  Ser Gly Arg Val Arg  Asn Leu Ile
    1430                 1435                 1440

Ile Lys  His Lys Val Arg Asn  Gln Thr Val Ala Ser  Trp Tyr Gly
    1445                 1450                 1455

Glu Glu  Glu Val Tyr Gly Leu  Pro Lys Val Val Thr  Ile Ile Arg
    1460                 1465                 1470

Ala Cys  Thr Leu Asn Lys Asn  Lys His Cys Ile Ile  Cys Thr Val
    1475                 1480                 1485

Cys Glu  Ala Lys Lys Trp Lys  Gly Gly Asn Cys Pro  Lys Cys Gly
```

```
    1490                1495                1500

Arg His Gly Lys Pro Ile Thr Cys Gly Met Thr Leu Ala Asp Phe
    1505                1510                1515

Glu Glu Arg His Tyr Lys Arg Ile Phe Ile Arg Glu Gly Thr Phe
    1520                1525                1530

Glu Gly Pro Phe Arg Gln Glu Tyr Asn Gly Phe Val Gln Tyr Ala
    1535                1540                1545

Ala Arg Gly Gln Leu Phe Leu Arg Asn Leu Pro Ile Leu Ala Thr
    1550                1555                1560

Lys Val Lys Met Leu Met Val Gly Asn Leu Gly Glu Glu Ile Gly
    1565                1570                1575

Asp Leu Glu His Leu Gly Trp Ile Leu Arg Gly Pro Ala Val Cys
    1580                1585                1590

Lys Lys Ile Thr Glu His Glu Lys Cys His Val Ser Ile Leu Asp
    1595                1600                1605

Lys Leu Thr Ala Phe Phe Gly Val Met Pro Arg Gly Thr Thr Pro
    1610                1615                1620

Arg Ala Pro Val Arg Phe Pro Thr Ala Leu Leu Lys Val Arg Arg
    1625                1630                1635

Gly Leu Glu Thr Gly Trp Ala Tyr Thr His Gln Gly Gly Ile Ser
    1640                1645                1650

Ser Val Asp His Val Thr Ala Gly Lys Asp Leu Leu Val Cys Asp
    1655                1660                1665

Ser Met Gly Arg Thr Arg Val Val Cys Gln Ser Asn Asn Lys Leu
    1670                1675                1680

Thr Asp Glu Thr Glu Tyr Gly Val Lys Thr Asp Ser Gly Cys Pro
    1685                1690                1695

Asp Gly Ala Arg Cys Tyr Val Leu Asn Pro Glu Ala Val Asn Ile
    1700                1705                1710
```

```
Ser Gly  Ser Lys Gly Ala Val  Val His Leu Gln Lys  Thr Gly Gly
    1715                 1720                 1725

Glu Phe  Thr Cys Val Thr Ala  Ser Gly Thr Pro Ala  Phe Phe Asp
    1730                 1735                 1740

Leu Lys  Asn Leu Lys Gly Trp  Ser Gly Leu Pro Ile  Tyr Glu Ala
    1745                 1750                 1755

Ser Ser  Gly Arg Val Val Gly  Arg Val Lys Val Gly  Lys Asn Glu
    1760                 1765                 1770

Glu Ser  Lys Pro Thr Lys Leu  Met Ser Gly Ile Gln  Thr Val Ser
    1775                 1780                 1785

Lys Ser  Thr Ala Asp Leu Thr  Glu Met Val Lys Lys  Ile Thr Ser
    1790                 1795                 1800

Met Asn  Arg Gly Asp Phe Lys  Gln Ile Thr Leu Ala  Thr Gly Ala
    1805                 1810                 1815

Gly Lys  Thr Thr Glu Leu Pro  Lys Ala Val Ile Glu  Glu Ile Gly
    1820                 1825                 1830

Arg His  Lys Arg Val Leu Val  Leu Ile Pro Leu Arg  Ala Ala Ala
    1835                 1840                 1845

Glu Ser  Val Tyr Gln Tyr Met  Arg Leu Lys His Pro  Ser Ile Ser
    1850                 1855                 1860

Phe Asn  Leu Arg Ile Gly Asp  Met Lys Glu Gly Asp  Met Ala Thr
    1865                 1870                 1875

Gly Ile  Thr Tyr Ala Ser Tyr  Gly Tyr Phe Cys Gln  Met Gln Gln
    1880                 1885                 1890

Pro Lys  Leu Arg Ala Ala Met  Val Glu Tyr Ser Tyr  Ile Phe Leu
    1895                 1900                 1905

Asp Glu  Tyr His Cys Ala Thr  Pro Glu Gln Leu Ala  Val Ile Gly
    1910                 1915                 1920

Lys Ile  His Arg Phe Ser Glu  Ser Ile Arg Val Val  Ala Met Thr
```

1925 1930 1935

Ala Thr Pro Ala Gly Ser Val Thr Thr Thr Gly Gln Lys His Pro
1940 1945 1950

Ile Glu Glu Phe Ile Ala Pro Glu Val Met Lys Gly Glu Asp Leu
1955 1960 1965

Gly Ser Gln Phe Leu Asp Ile Ala Gly Leu Lys Ile Pro Val Glu
1970 1975 1980

Glu Met Lys Gly Asn Met Leu Val Phe Val Pro Thr Arg Asn Met
1985 1990 1995

Ala Val Asp Val Ala Lys Lys Leu Lys Ala Lys Gly Tyr Asn Ser
2000 2005 2010

Gly Tyr Tyr Tyr Ser Gly Glu Asp Pro Ala Asn Leu Arg Val Val
2015 2020 2025

Thr Ser Gln Ser Pro Tyr Val Val Val Ala Thr Asn Ala Ile Glu
2030 2035 2040

Ser Gly Val Thr Leu Pro Asp Leu Asp Thr Val Val Asp Thr Gly
2045 2050 2055

Leu Lys Cys Glu Lys Arg Val Arg Val Ser Ser Lys Ile Pro Phe
2060 2065 2070

Ile Val Thr Gly Leu Lys Arg Met Ala Val Thr Val Gly Glu Gln
2075 2080 2085

Ala Gln Arg Arg Gly Arg Val Gly Arg Val Lys Pro Gly Arg Tyr
2090 2095 2100

Tyr Arg Ser Gln Glu Thr Ala Thr Gly Ser Lys Asp Tyr His Tyr
2105 2110 2115

Asp Leu Leu Gln Ala Gln Arg Tyr Gly Ile Glu Asp Gly Ile Asn
2120 2125 2130

Ile Thr Lys Ser Phe Arg Glu Met Asn Tyr Asp Trp Ser Leu Tyr
2135 2140 2145

```
Glu Glu  Asp Ser Leu Leu Ile  Thr Gln Leu Glu Ile  Leu Asn Asn
    2150                 2155                 2160

Leu Leu  Ile Ser Glu Asp Leu  Pro Ala Ala Val Lys  Asn Ile Met
    2165                 2170                 2175

Ala Arg  Thr Asp His Pro Glu  Pro Ile Gln Leu Ala  Tyr Asn Ser
    2180                 2185                 2190

Tyr Glu  Val Gln Val Pro Val  Leu Phe Pro Lys Ile  Arg Asn Gly
    2195                 2200                 2205

Glu Val  Thr Asp Thr Tyr Glu  Asn Tyr Ser Phe Leu  Asn Ala Arg
    2210                 2215                 2220

Lys Leu  Gly Glu Asp Val Pro  Thr Tyr Ile Tyr Ala  Thr Glu Asp
    2225                 2230                 2235

Glu Asp  Leu Ala Val Asp Leu  Leu Gly Leu Asp Trp  Pro Asp Pro
    2240                 2245                 2250

Gly Asn  Gln Gln Val Val Glu  Thr Gly Lys Ala Leu  Lys Gln Val
    2255                 2260                 2265

Val Gly  Leu Ser Ser Ala Glu  Asn Ala Leu Leu Ile  Ala Leu Phe
    2270                 2275                 2280

Gly Tyr  Val Gly Tyr Gln Ala  Leu Ser Lys Arg His  Val Pro Met
    2285                 2290                 2295

Ile Thr  Asp Ile Tyr Thr Ile  Glu Asp Gln Arg Leu  Glu Asp Thr
    2300                 2305                 2310

Thr His  Leu Gln Tyr Ala Pro  Asn Ala Ile Arg Thr  Glu Gly Lys
    2315                 2320                 2325

Glu Thr  Glu Leu Lys Glu Leu  Ala Val Gly Asp Leu  Asp Lys Ile
    2330                 2335                 2340

Met Gly  Ser Ile Ser Asp Tyr  Ala Ser Gly Gly Leu  Glu Phe Val
    2345                 2350                 2355

Arg Ser  Gln Ala Glu Lys Ile  Arg Ser Ala Pro Thr  Phe Lys Glu
```

2360 2365 2370

Asn Val Glu Thr Ala Lys Gly Tyr Val Gln Lys Phe Ile Asp Ala
2375 2380 2385

Leu Ile Glu Asn Lys Glu Thr Ile Ile Arg Tyr Gly Leu Trp Gly
2390 2395 2400

Thr His Thr Ala Leu Tyr Lys Ser Ile Ala Ala Arg Leu Gly His
2405 2410 2415

Glu Thr Ala Phe Ala Thr Leu Val Val Lys Trp Leu Ala Phe Gly
2420 2425 2430

Gly Glu Ser Val Ser Asp His Val Arg Gln Ala Ala Val Asp Leu
2435 2440 2445

Val Val Tyr Tyr Val Met Asn Lys Pro Ser Phe Pro Gly Asp Ser
2450 2455 2460

Glu Thr Gln Gln Glu Gly Arg Arg Phe Val Ala Ser Leu Phe Ile
2465 2470 2475

Ser Ala Leu Ala Thr Tyr Thr Tyr Lys Ser Trp Asn Tyr His Asn
2480 2485 2490

Leu Ser Lys Val Val Glu Pro Ala Leu Ala Tyr Leu Pro Tyr Ala
2495 2500 2505

Thr Ser Ala Leu Lys Met Phe Thr Pro Thr Arg Leu Glu Ser Val
2510 2515 2520

Val Ile Leu Ser Thr Thr Ile Tyr Lys Thr Tyr Leu Ser Ile Arg
2525 2530 2535

Lys Gly Lys Ser Asp Gly Leu Leu Gly Thr Gly Ile Ser Ala Ala
2540 2545 2550

Met Glu Ile Leu Ser Gln Asn Pro Val Ser Val Gly Ile Ser Val
2555 2560 2565

Met Leu Gly Val Gly Ala Ile Ala Ala His Asn Ala Ile Glu Ser
2570 2575 2580

```
Ser Glu  Gln Lys Arg Thr Leu  Leu Met Lys Val Phe  Val Lys Asn
    2585                 2590                 2595

Phe Leu  Asp Gln Ala Ala Thr  Asp Glu Leu Val Lys  Glu Asn Pro
    2600                 2605                 2610

Glu Lys  Ile Ile Met Ala Leu  Phe Glu Ala Val Gln  Thr Ile Gly
    2615                 2620                 2625

Asn Pro  Leu Arg Leu Ile Tyr  His Leu Tyr Gly Val  Tyr Tyr Lys
    2630                 2635                 2640

Gly Trp  Glu Ala Lys Glu Leu  Ser Glu Arg Thr Ala  Gly Arg Asn
    2645                 2650                 2655

Leu Phe  Thr Leu Ile Met Phe  Glu Ala Phe Glu Leu  Leu Gly Met
    2660                 2665                 2670

Asp Ser  Glu Gly Lys Ile Arg  Asn Leu Ser Gly Asn  Tyr Ile Leu
    2675                 2680                 2685

Asp Leu  Ile Tyr Ser Leu His  Lys Gln Ile Asn Arg  Gly Leu Lys
    2690                 2695                 2700

Lys Ile  Val Leu Gly Trp Ala  Pro Ala Pro Phe Ser  Cys Asp Trp
    2705                 2710                 2715

Thr Pro  Ser Asp Gly Arg Ile  Arg Leu Pro Thr Asp  Asn Tyr Leu
    2720                 2725                 2730

Arg Val  Glu Thr Lys Cys Pro  Cys Gly Tyr Glu Met  Lys Ala Leu
    2735                 2740                 2745

Arg Asn  Val Ser Gly Ser Leu  Thr Lys Val Glu Glu  Lys Gly Pro
    2750                 2755                 2760

Phe Leu  Cys Arg Asn Arg Pro  Gly Arg Gly Pro Val  Asn Tyr Arg
    2765                 2770                 2775

Val Thr  Lys Tyr Tyr Asp Asp  Asn Leu Thr Glu Ile  Lys Pro Val
    2780                 2785                 2790

Ala Lys  Leu Glu Gly Leu Val  Glu His Tyr Tyr Lys  Gly Val Thr
```

2795 2800 2805

Ala Arg Ile Asp Tyr Asp Lys Gly Lys Met Leu Val Ala Thr Asp
2810 2815 2820

Lys Trp Glu Val Glu His Gly Thr Val Thr Arg Leu Ala Lys Arg
2825 2830 2835

Tyr Ser Gly Val Gly Phe Lys Gly Ala Tyr Leu Gly Asp Glu Pro
2840 2845 2850

Asn Tyr Arg Asp Leu Val Glu Arg Asp Cys Ala Thr Ile Thr Lys
2855 2860 2865

Asn Thr Val Gln Phe Leu Lys Met Lys Lys Gly Cys Ala Phe Thr
2870 2875 2880

Tyr Asp Leu Thr Leu Ser Asn Leu Thr Arg Leu Ile Glu Leu Val
2885 2890 2895

His Arg Asn Asn Leu Glu Glu Lys Asp Ile Pro Ala Ala Thr Val
2900 2905 2910

Thr Thr Trp Leu Ala Tyr Thr Phe Val Asn Glu Asp Val Gly Thr
2915 2920 2925

Ile Arg Pro Val Leu Gly Glu Arg Val Ile Ala Asp Pro Val Val
2930 2935 2940

Asp Val Asn Leu Gln Pro Glu Val Gln Val Asp Thr Ser Glu Val
2945 2950 2955

Gly Ile Thr Leu Val Gly Lys Ala Ala Leu Met Thr Thr Gly Thr
2960 2965 2970

Thr Pro Val Val Glu Lys Thr Glu Pro Ser Ala Ser Ala Ser Pro
2975 2980 2985

Ser Ser Ile Lys Ile Gly Leu Asp Gln Gly Ser Tyr Pro Gly Pro
2990 2995 3000

Gly Leu Gln Asp Arg Thr Leu Val Asp Glu Ile His Ser Lys Asp
3005 3010 3015

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Glu Arg  Pro Phe Val Leu Val  Leu Gly Ser Lys Asn  Ser Met Ser
    3020                 3025                 3030

Asn Arg  Ala Lys Thr Ala Lys  Asn Ile Asn Leu Tyr  Thr Gly Lys
    3035                 3040                 3045

Asp Pro  Arg Glu Ile Arg Asp  Leu Met Ala Gln Gly  Arg Met Leu
    3050                 3055                 3060

Val Val  Ala Leu Arg Gly Phe  Asn Pro Glu Leu Ser  Glu Leu Val
    3065                 3070                 3075

Asp Phe  Lys Gly Thr Phe Leu  Asp Arg Glu Ala Leu  Glu Ala Leu
    3080                 3085                 3090

Ser Leu  Gly Arg Pro Arg Pro  Lys Gln Val Thr Thr  Ser Thr Val
    3095                 3100                 3105

Arg Glu  Leu Leu Glu Gln Glu  Glu Gln Val Glu Val  Pro Asn Trp
    3110                 3115                 3120

Phe Gly  Ala Asp Asp Pro Val  Phe Leu Glu Val Ala  Leu Lys Gly
    3125                 3130                 3135

Asp Lys  Tyr His Leu Val Gly  Asp Val Asp Lys Val  Lys Asp Gln
    3140                 3145                 3150

Ala Lys  Gly Leu Gly Ala Thr  Asp Gln Thr Arg Ile  Val Lys Glu
    3155                 3160                 3165

Val Gly  Ala Arg Thr Tyr Thr  Met Lys Leu Ser Ser  Trp Phe Leu
    3170                 3175                 3180

Gln Ala  Ser Asn Lys Gln Met  Ser Leu Thr Pro Leu  Phe Glu Glu
    3185                 3190                 3195

Leu Leu  Leu Arg Cys Pro Pro  Lys Ala Lys Asn Asn  Lys Gly His
    3200                 3205                 3210

Met Ala  Ser Ala Tyr Gln Leu  Ala Gln Gly Asn Trp  Glu Pro Leu
    3215                 3220                 3225

Asp Cys  Gly Val Tyr Leu Gly  Thr Ile Pro Ala Arg  Arg Val Lys
```

3230 3235 3240

Ile His Pro Tyr Glu Ala Tyr Leu Lys Leu Lys Asp Leu Leu Glu
3245 3250 3255

Glu Glu Glu Lys Lys Pro Lys Ser Arg Asp Thr Val Ile Arg Glu
3260 3265 3270

His Asn Lys Trp Ile Leu Lys Lys Val Arg His Gln Gly Asn Leu
3275 3280 3285

Asn Thr Lys Lys Ile Leu Asn Pro Gly Lys Leu Ser Glu Gln Leu
3290 3295 3300

Asp Arg Glu Gly His Lys Arg Asn Ile Tyr Asn Asn Gln Ile Gly
3305 3310 3315

Thr Ile Leu Thr Gly Ala Gly Val Arg Leu Glu Lys Leu Pro Val
3320 3325 3330

Val Arg Ala Gln Thr Asp Thr Lys Ser Phe His Glu Ala Ile Arg
3335 3340 3345

Asp Lys Ile Asp Lys Asn Glu Asn Gln Gln Ser Pro Gly Leu His
3350 3355 3360

Gly Lys Leu Leu Glu Ile Phe His Thr Ile Ala Gln Pro Ser Leu
3365 3370 3375

Arg His Thr Tyr Gly Glu Val Thr Trp Glu Gln Leu Glu Ala Gly
3380 3385 3390

Ile Asn Arg Lys Gly Ala Ala Gly Phe Leu Glu Lys Lys Asn Val
3395 3400 3405

Gly Glu Val Leu Asp Ser Glu Lys His Leu Val Glu Gln Leu Ile
3410 3415 3420

Arg Asp Leu Lys Ala Gly Arg Lys Ile Arg Tyr Tyr Glu Thr Ala
3425 3430 3435

Ile Pro Lys Asn Glu Lys Arg Asp Val Ser Asp Asp Trp Gln Ala
3440 3445 3450

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Gly Asp  Leu Val Asp Glu Lys  Lys Pro Arg Val Ile  Gln Tyr Pro
    3455                 3460                 3465

Glu Ala  Lys Thr Arg Leu Ala  Ile Thr Lys Val Met  Tyr Asn Trp
    3470                 3475                 3480

Val Lys  Gln Gln Pro Val Val  Ile Pro Gly Tyr Glu  Gly Lys Thr
    3485                 3490                 3495

Pro Leu  Phe Asn Ile Phe Asn  Lys Val Arg Lys Glu  Trp Asp Leu
    3500                 3505                 3510

Phe Asn  Glu Pro Val Ala Val  Ser Phe Asp Thr Lys  Ala Trp Asp
    3515                 3520                 3525

Thr Gln  Val Thr Ser Lys Asp  Leu Arg Leu Ile Gly  Glu Ile Gln
    3530                 3535                 3540

Lys Tyr  Tyr Tyr Arg Lys Glu  Trp His Lys Phe Ile  Asp Thr Ile
    3545                 3550                 3555

Thr Asp  His Met Val Glu Val  Pro Val Ile Thr Ala  Asp Gly Glu
    3560                 3565                 3570

Val Tyr  Ile Arg Asn Gly Gln  Arg Gly Ser Gly Gln  Pro Asp Thr
    3575                 3580                 3585

Ser Ala  Gly Asn Ser Met Leu  Asn Val Leu Thr Met  Met Tyr Ala
    3590                 3595                 3600

Phe Cys  Glu Ser Thr Gly Ile  Pro Tyr Lys Ser Phe  Asn Arg Val
    3605                 3610                 3615

Ala Arg  Ile His Val Cys Gly  Asp Asp Gly Phe Leu  Ile Thr Glu
    3620                 3625                 3630

Arg Gly  Leu Gly Leu Lys Phe  Ala Asn Asn Gly Met  Gln Ile Leu
    3635                 3640                 3645

His Glu  Ala Gly Lys Pro Gln  Lys Ile Thr Glu Gly  Glu Arg Met
    3650                 3655                 3660

Lys Val  Ala Tyr Arg Phe Glu  Asp Ile Glu Phe Cys  Ser His Thr
```

3665 3670 3675

Pro Val Pro Val Arg Trp Ser Asp Asn Thr Ser Ser Tyr Met Ala
3680 3685 3690

Gly Arg Asp Thr Ala Ile Ile Leu Ser Lys Met Ala Thr Arg Leu
3695 3700 3705

Asp Ser Ser Gly Glu Arg Gly Thr Thr Ala Tyr Glu Lys Ala Val
3710 3715 3720

Ala Phe Ser Phe Leu Leu Met Tyr Ser Trp Asn Pro Leu Val Arg
3725 3730 3735

Arg Ile Cys Leu Leu Val Leu Ser Gln Gln Pro Glu Thr Ala Pro
3740 3745 3750

Ser Thr Gln Thr Thr Tyr Tyr Tyr Lys Gly Asp Pro Ile Gly Ala
3755 3760 3765

Tyr Lys Asp Val Ile Gly Lys Asn Leu Ser Glu Leu Lys Arg Thr
3770 3775 3780

Gly Phe Glu Lys Leu Ala Asn Leu Asn Leu Ser Leu Ser Thr Leu
3785 3790 3795

Gly Ile Trp Ser Lys His Thr Ser Lys Arg Ile Ile Gln Asp Cys
3800 3805 3810

Val Thr Ile Gly Lys Glu Glu Gly Asn Trp Leu Val Asn Ala Asp
3815 3820 3825

Arg Leu Ile Ser Ser Lys Thr Gly His Leu Tyr Ile Pro Asp Lys
3830 3835 3840

Gly Tyr Thr Leu Gln Gly Lys His Tyr Glu Gln Leu Gln Leu Gln
3845 3850 3855

Ala Arg Thr Ser Pro Ile Met Gly Val Gly Thr Glu Arg Tyr Lys
3860 3865 3870

Leu Gly Pro Ile Val Asn Leu Leu Leu Arg Arg Leu Lys Val Leu
3875 3880 3885

```
Leu Met  Ala Ala Val Gly Ala  Ser Ser
    3890                3895


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<213>  BVDV

<400>  6

Met Glu Leu Ile Thr Asn Glu Leu Leu Tyr Lys Thr Tyr Lys Gln Lys
1               5                  10                  15

Pro Ala Gly Val Glu Glu Pro Val Tyr Asp Gln Ala Gly Asn Pro Leu
            20                  25                  30

Phe Gly Glu Arg Gly Val Val His Pro Gln Ala Thr Leu Lys Leu Pro
        35                  40                  45

His Lys Arg Gly Glu Ser Glu Val Pro Thr Asn Leu Ala Ser Leu Pro
    50                  55                  60

Lys Arg Gly Asp Cys Arg Ser Gly Asn Ser Lys Gly Pro Val Ser Gly
65                  70                  75                  80

Ile Tyr Leu Lys Pro Gly Pro Leu Phe Tyr Gln Asp Tyr Lys Gly Pro
                85                  90                  95

Val Tyr His Arg Ala Pro Leu Glu Leu Phe Gln Glu Thr Ser Met Cys
            100                 105                 110

Glu Thr Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Ser Lys Leu
        115                 120                 125

Tyr His Ile Tyr Val Cys Ile Asp Gly Cys Ile Ile Ile Lys Ser Ala
    130                 135                 140

Thr Lys Asp His Gln Lys Val Phe Lys Trp Val His Asn Lys Leu Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Thr Asn Ala Glu Gly Ala
                165                 170                 175

Thr Arg Lys Lys Gln Gln Lys Pro Asp Arg Leu Glu Lys Gly Arg Met
            180                 185                 190
```

```
Lys Ile Thr Pro Lys Glu Ser Glu Lys Asp Ser Lys Thr Lys Pro Pro
        195                 200                 205

Asp Ala Thr Ile Val Val Asp Gly Val Lys Tyr Gln Val Lys Lys Lys
    210                 215                 220

Gly Lys Val Lys Ser Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys
225                 230                 235                 240

Asn Lys Pro Gln Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala
                245                 250                 255

Trp Ala Ile Ile Ala Leu Val Leu Phe Asp Ile Ala Val Gly Glu Asn
            260                 265                 270

Ile Thr Gln Trp Asn Leu Gln Asp Asn Gly Thr Glu Gly Ile Gln Arg
        275                 280                 285

Ala Met Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro
    290                 295                 300

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

Leu Lys Ala Ile His Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr
                325                 330                 335

Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys
            340                 345                 350

Asn Trp Tyr Asn Ile Glu Pro Trp Ile Leu Leu Met Asn Lys Thr Gln
        355                 360                 365

Ala Asn Leu Thr Glu Gly Gln Pro Pro Arg Glu Cys Ala Val Thr Cys
    370                 375                 380

Arg Tyr Asp Arg Asp Ser Asp Leu Asn Ile Val Thr Gln Ala Arg Asp
385                 390                 395                 400

Ser Pro Thr Pro Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe
                405                 410                 415
```

```
Ala Gly Val Leu Val Gln Gly Pro Cys Asn Phe Glu Ile Ala Ala Ser
            420                 425                 430

Asp Val Leu Phe Lys Glu His Asp Ser Thr Gly Met Ile Gln Asp Thr
        435                 440                 445

Ala His Tyr Leu Val Asp Gly Leu Thr Asn Ser Leu Glu Ser Ala Arg
    450                 455                 460

Gln Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Arg Gln Leu Arg Ile
465                 470                 475                 480

Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Thr Trp Phe Gly Ala Tyr
                485                 490                 495

Ala Ala Ser Pro Tyr Cys Glu Val Glu Arg Arg Leu Gly Tyr Ile Trp
            500                 505                 510

Tyr Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile
        515                 520                 525

Val Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Leu Leu
    530                 535                 540

His Glu Met Gly Gly His Leu Ser Glu Val Leu Leu Leu Ser Val Val
545                 550                 555                 560

Val Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Ile Val Tyr Leu Ile
                565                 570                 575

Leu His Phe Thr Ile Pro Gln Gly His Thr Asp Ile Glu Asp Cys Asp
            580                 585                 590

Lys Asn Gln Leu Asn Leu Thr Val Gly Leu Thr Thr Ala Glu Val Val
        595                 600                 605

Pro Ser Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp
    610                 615                 620

Trp Trp Pro Tyr Glu Thr Ala Thr Val Leu Val Phe Glu Glu Val Gly
625                 630                 635                 640

Gln Val Ile Lys Leu Val Leu Arg Ala Leu Arg Asp Leu Thr Arg Ile
                645                 650                 655
```

```
Trp Thr Ala Ala Thr Thr Thr Ala Phe Leu Val Cys Met Val Lys Val
            660                 665                 670

Val Arg Gly Gln Val Leu Gln Gly Ile Leu Trp Leu Met Leu Ile Thr
        675                 680                 685

Gly Ala Gln Gly Tyr Pro Asp Cys Lys Pro Asp Phe Ser Tyr Ala Ile
    690                 695                 700

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

Gln Trp Tyr Lys Tyr Ser Asp Glu Met Arg Leu Gln Asp Thr Val Val
                725                 730                 735

Thr Val Trp Cys Lys Asn Gly Glu Phe Arg His Leu Ile Thr Cys Glu
            740                 745                 750

Arg Glu Ala Arg Tyr Leu Ala Ile Leu His Thr Arg Ala Leu Pro Thr
        755                 760                 765

Ser Val Val Phe Glu Lys Ile Ile Asn Gly Lys Glu Gln Glu Asp Ile
    770                 775                 780

Val Glu Met Ser Asp Asn Phe Glu Phe Gly Leu Cys Pro Cys Asp Ala
785                 790                 795                 800

Lys Pro Leu Val Arg Gly Lys Phe Asn Val Thr Leu Leu Asn Gly Pro
                805                 810                 815

Ala Phe Gln Met Val Cys Pro Ile Gly Trp Thr Gly Thr Val Ser Cys
            820                 825                 830

Thr Leu Ala Asn Lys Asp Thr Leu Ala Thr Thr Val Val Arg Thr Tyr
        835                 840                 845

Lys Arg Asp Lys Pro Phe Pro Tyr Arg Gln Gly Cys Ile Thr Gln Lys
    850                 855                 860

Thr Ile Gly Glu Asp Leu Tyr Asp Cys Val Leu Gly Gly Asn Trp Thr
865                 870                 875                 880
```

```
Cys Val Pro Gly Asn Gln Leu Arg Tyr Val Gly Gly Pro Val Glu Ser
                885                 890                 895

Cys Lys Trp Cys Gly Tyr Lys Phe Asp Lys Ser Glu Gly Leu Pro His
            900                 905                 910

Phe Pro Ile Gly Lys Cys Lys Leu Lys Asn Glu Ser Gly Tyr Arg Gln
        915                 920                 925

Val Asp Glu Thr Ser Cys Asn Arg Asp Gly Val Ala Ile Val Pro Ser
    930                 935                 940

Gly Leu Val Lys Cys Lys Ile Gly Asn Thr Val Val Gln Val Ile Ala
945                 950                 955                 960

Met Asp Asp Lys Leu Gly Pro Met Pro Cys Arg Pro His Glu Ile Ile
                965                 970                 975

Ser Ser Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Ala
            980                 985                 990

Arg Thr Leu Lys Asn Lys Tyr Phe  Glu Pro Arg Asp Asn  Tyr Phe Gln
        995                 1000                1005

Gln Tyr  Met Leu Lys Gly Glu  Tyr Gln Tyr Trp Phe  Asp Leu Glu
    1010                1015                1020

Ile Thr  Asp His His Arg Asp  Tyr Phe Ala Glu Ser  Leu Leu Val
    1025                1030                1035

Ile Val  Val Ala Leu Leu Gly  Gly Arg Tyr Val Leu  Trp Leu Leu
    1040                1045                1050

Val Thr  Tyr Met Ile Leu Ser  Glu Gln Met Thr Leu  Gly Ala Gln
    1055                1060                1065

Tyr Gly  Ala Gly Glu Ile Val  Met Met Gly Asn Leu  Leu Thr His
    1070                1075                1080

Asp Ser  Ile Glu Val Val Thr  Tyr Phe Leu Leu Leu  Tyr Leu Leu
    1085                1090                1095

Leu Arg  Glu Glu Asn Ile Lys  Lys Trp Val Ile Leu  Ile Tyr His
    1100                1105                1110
```

```
Ile Ile  Val Met His Pro Leu  Lys Ser Met Thr Val  Ile Leu Leu
    1115                 1120                 1125

Met Val  Gly Gly Met Ala Lys  Ala Glu Pro Asp Thr  Gln Ser Tyr
    1130                 1135                 1140

Leu Glu  Arg Val Asp Leu Ser  Phe Thr Met Ile Thr  Leu Ile Val
    1145                 1150                 1155

Val Gly  Leu Val Ile Ala Arg  Arg Asp Pro Thr Val  Val Pro Leu
    1160                 1165                 1170

Val Thr  Ile Val Ala Ala Leu  Lys Ile Thr Gly Leu  Gly Phe Gly
    1175                 1180                 1185

Pro Gly  Val Asp Val Ala Met  Ala Val Leu Thr Leu  Thr Leu Leu
    1190                 1195                 1200

Met Val  Ser Tyr Val Thr Asp  Tyr Phe Arg Tyr Lys  Arg Trp Leu
    1205                 1210                 1215

Gln Cys  Ile Leu Ser Leu Val  Ala Gly Val Phe Leu  Ile Arg Ser
    1220                 1225                 1230

Leu Lys  His Leu Gly Glu Ile  Glu Thr Pro Glu Leu  Thr Ile Pro
    1235                 1240                 1245

Asn Trp  Arg Pro Leu Thr Phe  Ile Leu Leu Tyr Leu  Thr Ser Ala
    1250                 1255                 1260

Thr Val  Val Thr Arg Trp Lys  Val Asp Ile Ala Gly  Ile Leu Leu
    1265                 1270                 1275

Gln Gly  Ala Pro Ile Leu Leu  Leu Ile Ala Thr Leu  Trp Ala Asp
    1280                 1285                 1290

Phe Leu  Thr Leu Val Leu Ile  Leu Pro Thr Tyr Glu  Leu Val Lys
    1295                 1300                 1305

Leu Tyr  Tyr Leu Lys Asn Ile  Lys Thr Asp Val Glu  Arg Ser Trp
    1310                 1315                 1320
```

```
Leu Gly  Gly Leu Asp Tyr Lys  Thr Ile Asp Ser Val  Tyr Asp Val
    1325                 1330                 1335

Asp Glu  Ser Gly Glu Gly Val  Tyr Leu Phe Pro Ser  Arg Gln Asp
    1340                 1345                 1350

Gly Lys  Lys Asn Thr Ser Ile  Leu Leu Pro Leu Ile  Arg Ala Thr
    1355                 1360                 1365

Leu Ile  Ser Cys Val Ser Ser  Lys Trp Gln Met Val  Tyr Met Ala
    1370                 1375                 1380

Tyr Leu  Thr Leu Asp Phe Met  Tyr Tyr Met His Arg  Lys Val Ile
    1385                 1390                 1395

Glu Glu  Ile Ser Gly Gly Thr  Asn Val Ile Ser Arg  Val Ile Ala
    1400                 1405                 1410

Ala Leu  Ile Glu Leu Asn Trp  Ser Met Glu Glu Glu  Glu Ser Lys
    1415                 1420                 1425

Gly Leu  Lys Lys Phe Phe Val  Leu Ser Gly Arg Val  Arg Asn Leu
    1430                 1435                 1440

Ile Ile  Lys His Lys Val Arg  Asn Gln Thr Val Ala  Ser Trp Tyr
    1445                 1450                 1455

Gly Glu  Glu Glu Val Tyr Gly  Leu Pro Lys Val Val  Thr Ile Ile
    1460                 1465                 1470

Arg Ala  Cys Thr Leu Asn Lys  Asn Lys His Cys Ile  Ile Cys Thr
    1475                 1480                 1485

Val Cys  Glu Ala Lys Lys Trp  Lys Gly Gly Asn Cys  Pro Lys Cys
    1490                 1495                 1500

Gly Arg  His Gly Lys Pro Ile  Thr Cys Gly Met Thr  Leu Ala Asp
    1505                 1510                 1515

Phe Glu  Glu Arg His Tyr Lys  Arg Ile Phe Ile Arg  Glu Gly Thr
    1520                 1525                 1530

Phe Glu  Gly Pro Phe Arg Gln  Glu Tyr Asn Gly Phe  Val Gln Tyr
    1535                 1540                 1545
```

```
Ala Ala  Arg Gly Gln Leu Phe  Leu Arg Asn Leu Pro  Ile Leu Ala
     1550                1555                1560

Thr Lys  Val Lys Met Leu Met  Val Gly Asn Leu Gly  Glu Glu Ile
     1565                1570                1575

Gly Asp  Leu Glu His Leu Gly  Trp Ile Leu Arg Gly  Pro Ala Val
     1580                1585                1590

Cys Lys  Lys Ile Thr Glu His  Glu Lys Cys His Val  Ser Ile Leu
     1595                1600                1605

Asp Lys  Leu Thr Ala Phe Phe  Gly Val Met Pro Arg  Gly Thr Thr
     1610                1615                1620

Pro Arg  Ala Pro Val Arg Phe  Pro Thr Ala Leu Leu  Lys Val Arg
     1625                1630                1635

Arg Gly  Leu Glu Thr Gly Trp  Ala Tyr Thr His Gln  Gly Gly Ile
     1640                1645                1650

Ser Ser  Val Asp His Val Thr  Ala Gly Lys Asp Leu  Leu Val Cys
     1655                1660                1665

Asp Ser  Met Gly Arg Thr Arg  Val Val Cys Gln Ser  Asn Asn Lys
     1670                1675                1680

Leu Thr  Asp Glu Thr Glu Tyr  Gly Val Lys Thr Asp  Ser Gly Cys
     1685                1690                1695

Pro Asp  Gly Ala Arg Cys Tyr  Val Leu Asn Pro Glu  Ala Val Asn
     1700                1705                1710

Ile Ser  Gly Ser Lys Gly Ala  Val Val His Leu Gln  Lys Thr Gly
     1715                1720                1725

Gly Glu  Phe Thr Cys Val Thr  Ala Ser Gly Thr Pro  Ala Phe Phe
     1730                1735                1740

Asp Leu  Lys Asn Leu Lys Gly  Trp Ser Gly Leu Pro  Ile Tyr Glu
     1745                1750                1755
```

```
Ala Ser  Ser Gly Arg Val Val  Gly Arg Val Lys Val  Gly Lys Asn
    1760                 1765                 1770

Glu Glu  Ser Lys Pro Thr Lys  Leu Met Ser Gly Ile  Gln Thr Val
    1775                 1780                 1785

Ser Lys  Ser Thr Ala Asp Leu  Thr Glu Met Val Lys  Lys Ile Thr
    1790                 1795                 1800

Ser Met  Asn Arg Gly Asp Phe  Lys Gln Ile Thr Leu  Ala Thr Gly
    1805                 1810                 1815

Ala Gly  Lys Thr Thr Glu Leu  Pro Lys Ala Val Ile  Glu Glu Ile
    1820                 1825                 1830

Gly Arg  His Lys Arg Val Leu  Val Leu Ile Pro Leu  Arg Ala Ala
    1835                 1840                 1845

Ala Glu  Ser Val Tyr Gln Tyr  Met Arg Leu Lys His  Pro Ser Ile
    1850                 1855                 1860

Ser Phe  Asn Leu Arg Ile Gly  Asp Met Lys Glu Gly  Asp Met Ala
    1865                 1870                 1875

Thr Gly  Ile Thr Tyr Ala Ser  Tyr Gly Tyr Phe Cys  Gln Met Gln
    1880                 1885                 1890

Gln Pro  Lys Leu Arg Ala Ala  Met Val Glu Tyr Ser  Tyr Ile Phe
    1895                 1900                 1905

Leu Asp  Glu Tyr His Cys Ala  Thr Pro Glu Gln Leu  Ala Val Ile
    1910                 1915                 1920

Gly Lys  Ile His Arg Phe Ser  Glu Ser Ile Arg Val  Val Ala Met
    1925                 1930                 1935

Thr Ala  Thr Pro Ala Gly Ser  Val Thr Thr Thr Gly  Gln Lys His
    1940                 1945                 1950

Pro Ile  Glu Glu Phe Ile Ala  Pro Glu Val Met Lys  Gly Glu Asp
    1955                 1960                 1965

Leu Gly  Ser Gln Phe Leu Asp  Ile Ala Gly Leu Lys  Ile Pro Val
    1970                 1975                 1980
```

```
Glu Glu  Met Lys Gly Asn Met  Leu Val Phe Val Pro  Thr Arg Asn
    1985                 1990                 1995

Met Ala  Val Asp Val Ala Lys  Lys Leu Lys Ala Lys  Gly Tyr Asn
    2000                 2005                 2010

Ser Gly  Tyr Tyr Tyr Ser Gly  Glu Asp Pro Ala Asn  Leu Arg Val
    2015                 2020                 2025

Val Thr  Ser Gln Ser Pro Tyr  Val Val Val Ala Thr  Asn Ala Ile
    2030                 2035                 2040

Glu Ser  Gly Val Thr Leu Pro  Asp Leu Asp Thr Val  Val Asp Thr
    2045                 2050                 2055

Gly Leu  Lys Cys Glu Lys Arg  Val Arg Val Ser Ser  Lys Ile Pro
    2060                 2065                 2070

Phe Ile  Val Thr Gly Leu Lys  Arg Met Ala Val Thr  Val Gly Glu
    2075                 2080                 2085

Gln Ala  Gln Arg Arg Gly Arg  Val Gly Arg Val Lys  Pro Gly Arg
    2090                 2095                 2100

Tyr Tyr  Arg Ser Gln Glu Thr  Ala Thr Gly Ser Lys  Asp Tyr His
    2105                 2110                 2115

Tyr Asp  Leu Leu Gln Ala Gln  Arg Tyr Gly Ile Glu  Asp Gly Ile
    2120                 2125                 2130

Asn Ile  Thr Lys Ser Phe Arg  Glu Met Asn Tyr Asp  Trp Ser Leu
    2135                 2140                 2145

Tyr Glu  Glu Asp Ser Leu Leu  Ile Thr Gln Leu Glu  Ile Leu Asn
    2150                 2155                 2160

Asn Leu  Leu Ile Ser Glu Asp  Leu Pro Ala Ala Val  Lys Asn Ile
    2165                 2170                 2175

Met Ala  Arg Thr Asp His Pro  Glu Pro Ile Gln Leu  Ala Tyr Asn
    2180                 2185                 2190
```

```
Ser Tyr  Glu Val Gln Val Pro  Val Leu Phe Pro Lys  Ile Arg Asn
    2195                 2200                 2205

Gly Glu  Val Thr Asp Thr Tyr  Glu Asn Tyr Ser Phe  Leu Asn Ala
    2210                 2215                 2220

Arg Lys  Leu Gly Glu Asp Val  Pro Thr Tyr Ile Tyr  Ala Thr Glu
    2225                 2230                 2235

Asp Glu  Asp Leu Ala Val Asp  Leu Leu Gly Leu Asp  Trp Pro Asp
    2240                 2245                 2250

Pro Gly  Asn Gln Gln Val Val  Glu Thr Gly Lys Ala  Leu Lys Gln
    2255                 2260                 2265

Val Val  Gly Leu Ser Ser Ala  Glu Asn Ala Leu Leu  Ile Ala Leu
    2270                 2275                 2280

Phe Gly  Tyr Val Gly Tyr Gln  Ala Leu Ser Lys Arg  His Val Pro
    2285                 2290                 2295

Met Ile  Thr Asp Ile Tyr Thr  Ile Glu Asp Gln Arg  Leu Glu Asp
    2300                 2305                 2310

Thr Thr  His Leu Gln Tyr Ala  Pro Asn Ala Ile Arg  Thr Glu Gly
    2315                 2320                 2325

Lys Glu  Thr Glu Leu Lys Glu  Leu Ala Val Gly Asp  Leu Asp Lys
    2330                 2335                 2340

Ile Met  Gly Ser Ile Ser Asp  Tyr Ala Ser Gly Gly  Leu Glu Phe
    2345                 2350                 2355

Val Arg  Ser Gln Ala Glu Lys  Ile Arg Ser Ala Pro  Thr Phe Lys
    2360                 2365                 2370

Glu Asn  Val Glu Thr Ala Lys  Gly Tyr Val Gln Lys  Phe Ile Asp
    2375                 2380                 2385

Ala Leu  Ile Glu Asn Lys Glu  Thr Ile Ile Arg Tyr  Gly Leu Trp
    2390                 2395                 2400

Gly Thr  His Thr Ala Leu Tyr  Lys Ser Ile Ala Ala  Arg Leu Gly
    2405                 2410                 2415
```

```
His Glu  Thr Ala Phe Ala Thr  Leu Val Val Lys Trp  Leu Ala Phe
    2420                 2425                 2430

Gly Gly  Glu Ser Val Ser Asp  His Val Arg Gln Ala  Ala Val Asp
    2435                 2440                 2445

Leu Val  Val Tyr Tyr Val Met  Asn Lys Pro Ser Phe  Pro Gly Asp
    2450                 2455                 2460

Ser Glu  Thr Gln Gln Glu Gly  Arg Arg Phe Val Ala  Ser Leu Phe
    2465                 2470                 2475

Ile Ser  Ala Leu Ala Thr Tyr  Thr Tyr Lys Ser Trp  Asn Tyr His
    2480                 2485                 2490

Asn Leu  Ser Lys Val Val Glu  Pro Ala Leu Ala Tyr  Leu Pro Tyr
    2495                 2500                 2505

Ala Thr  Ser Ala Leu Lys Met  Phe Thr Pro Thr Arg  Leu Glu Ser
    2510                 2515                 2520

Val Val  Ile Leu Ser Thr Thr  Ile Tyr Lys Thr Tyr  Leu Ser Ile
    2525                 2530                 2535

Arg Lys  Gly Lys Ser Asp Gly  Leu Leu Gly Thr Gly  Ile Ser Ala
    2540                 2545                 2550

Ala Met  Glu Ile Leu Ser Gln  Asn Pro Val Ser Val  Gly Ile Ser
    2555                 2560                 2565

Val Met  Leu Gly Val Gly Ala  Ile Ala Ala His Asn  Ala Ile Glu
    2570                 2575                 2580

Ser Ser  Glu Gln Lys Arg Thr  Leu Leu Met Lys Val  Phe Val Lys
    2585                 2590                 2595

Asn Phe  Leu Asp Gln Ala Ala  Thr Asp Glu Leu Val  Lys Glu Asn
    2600                 2605                 2610

Pro Glu  Lys Ile Ile Met Ala  Leu Phe Glu Ala Val  Gln Thr Ile
    2615                 2620                 2625
```

```
Gly Asn  Pro Leu Arg Leu Ile  Tyr His Leu Tyr Gly  Val Tyr Tyr
    2630                 2635                 2640

Lys Gly  Trp Glu Ala Lys Glu  Leu Ser Glu Arg Thr  Ala Gly Arg
    2645                 2650                 2655

Asn Leu  Phe Thr Leu Ile Met  Phe Glu Ala Phe Glu  Leu Leu Gly
    2660                 2665                 2670

Met Asp  Ser Glu Gly Lys Ile  Arg Asn Leu Ser Gly  Asn Tyr Ile
    2675                 2680                 2685

Leu Asp  Leu Ile Tyr Ser Leu  His Lys Gln Ile Asn  Arg Gly Leu
    2690                 2695                 2700

Lys Lys  Ile Val Leu Gly Trp  Ala Pro Ala Pro Phe  Ser Cys Asp
    2705                 2710                 2715

Trp Thr  Pro Ser Asp Gly Arg  Ile Arg Leu Pro Thr  Asp Asn Tyr
    2720                 2725                 2730

Leu Arg  Val Glu Thr Lys Cys  Pro Cys Gly Tyr Glu  Met Lys Ala
    2735                 2740                 2745

Leu Arg  Asn Val Ser Gly Ser  Leu Thr Lys Val Glu  Glu Lys Gly
    2750                 2755                 2760

Pro Phe  Leu Cys Arg Asn Arg  Pro Gly Arg Gly Pro  Val Asn Tyr
    2765                 2770                 2775

Arg Val  Thr Lys Tyr Tyr Asp  Asp Asn Leu Thr Glu  Ile Lys Pro
    2780                 2785                 2790

Val Ala  Lys Leu Glu Gly Leu  Val Glu His Tyr Tyr  Lys Gly Val
    2795                 2800                 2805

Thr Ala  Arg Ile Asp Tyr Asp  Lys Gly Lys Met Leu  Val Ala Thr
    2810                 2815                 2820

Asp Lys  Trp Glu Val Glu His  Gly Thr Val Thr Arg  Leu Ala Lys
    2825                 2830                 2835

Arg Tyr  Ser Gly Val Gly Phe  Lys Gly Ala Tyr Leu  Gly Asp Glu
    2840                 2845                 2850
```

```
Pro Asn  Tyr Arg Asp Leu Val  Glu Arg Asp Cys Ala  Thr Ile Thr
    2855                 2860                 2865

Lys Asn  Thr Val Gln Phe Leu  Lys Met Lys Lys Gly  Cys Ala Phe
    2870                 2875                 2880

Thr Tyr  Asp Leu Thr Leu Ser  Asn Leu Thr Arg Leu  Ile Glu Leu
    2885                 2890                 2895

Val His  Arg Asn Asn Leu Glu  Glu Lys Asp Ile Pro  Ala Ala Thr
    2900                 2905                 2910

Val Thr  Thr Trp Leu Ala Tyr  Thr Phe Val Asn Glu  Asp Val Gly
    2915                 2920                 2925

Thr Ile  Arg Pro Val Leu Gly  Glu Arg Val Ile Ala  Asp Pro Val
    2930                 2935                 2940

Val Asp  Val Asn Leu Gln Pro  Glu Val Gln Val Asp  Thr Ser Glu
    2945                 2950                 2955

Val Gly  Ile Thr Leu Val Gly  Lys Ala Ala Leu Met  Thr Thr Gly
    2960                 2965                 2970

Thr Thr  Pro Val Val Glu Lys  Thr Glu Pro Ser Ala  Ser Ala Ser
    2975                 2980                 2985

Pro Ser  Ser Ile Lys Ile Gly  Leu Asp Gln Gly Ser  Tyr Pro Gly
    2990                 2995                 3000

Pro Gly  Leu Gln Asp Arg Thr  Leu Val Asp Glu Ile  His Ser Lys
    3005                 3010                 3015

Asp Glu  Arg Pro Phe Val Leu  Val Leu Gly Ser Lys  Asn Ser Met
    3020                 3025                 3030

Ser Asn  Arg Ala Lys Thr Ala  Lys Asn Ile Asn Leu  Tyr Thr Gly
    3035                 3040                 3045

Lys Asp  Pro Arg Glu Ile Arg  Asp Leu Met Ala Gln  Gly Arg Met
    3050                 3055                 3060
```

```
Leu Val  Val Ala Leu Arg Gly  Phe Asn Pro Glu Leu  Ser Glu Leu
    3065                 3070                 3075

Val Asp  Phe Lys Gly Thr Phe  Leu Asp Arg Glu Ala  Leu Glu Ala
    3080                 3085                 3090

Leu Ser  Leu Gly Arg Pro Arg  Pro Lys Gln Val Thr  Thr Ser Thr
    3095                 3100                 3105

Val Arg  Glu Leu Leu Glu Gln  Glu Glu Gln Val Glu  Val Pro Asn
    3110                 3115                 3120

Trp Phe  Gly Ala Asp Asp Pro  Val Phe Leu Glu Val  Ala Leu Lys
    3125                 3130                 3135

Gly Asp  Lys Tyr His Leu Val  Gly Asp Val Asp Lys  Val Lys Asp
    3140                 3145                 3150

Gln Ala  Lys Gly Leu Gly Ala  Thr Asp Gln Thr Arg  Ile Val Lys
    3155                 3160                 3165

Glu Val  Gly Ala Arg Thr Tyr  Thr Met Lys Leu Ser  Ser Trp Phe
    3170                 3175                 3180

Leu Gln  Ala Ser Asn Lys Gln  Met Ser Leu Thr Pro  Leu Phe Glu
    3185                 3190                 3195

Glu Leu  Leu Leu Arg Cys Pro  Pro Lys Ala Lys Asn  Asn Lys Gly
    3200                 3205                 3210

His Met  Ala Ser Ala Tyr Gln  Leu Ala Gln Gly Asn  Trp Glu Pro
    3215                 3220                 3225

Leu Asp  Cys Gly Val Tyr Leu  Gly Thr Ile Pro Ala  Arg Arg Val
    3230                 3235                 3240

Lys Ile  His Pro Tyr Glu Ala  Tyr Leu Lys Leu Lys  Asp Leu Leu
    3245                 3250                 3255

Glu Glu  Glu Glu Lys Lys Pro  Lys Ser Arg Asp Thr  Val Ile Arg
    3260                 3265                 3270

Glu His  Asn Lys Trp Ile Leu  Lys Lys Val Arg His  Gln Gly Asn
    3275                 3280                 3285
```

```
Leu Asn  Thr Lys Lys Ile Leu  Asn Pro Gly Lys Leu  Ser Glu Gln
    3290                3295                3300

Leu Asp  Arg Glu Gly His Lys  Arg Asn Ile Tyr Asn  Asn Gln Ile
    3305                3310                3315

Gly Thr  Ile Leu Thr Gly Ala  Gly Val Arg Leu Glu  Lys Leu Pro
    3320                3325                3330

Val Val  Arg Ala Gln Thr Asp  Thr Lys Ser Phe His  Glu Ala Ile
    3335                3340                3345

Arg Asp  Lys Ile Asp Lys Asn  Glu Asn Gln Gln Ser  Pro Gly Leu
    3350                3355                3360

His Gly  Lys Leu Leu Glu Ile  Phe His Thr Ile Ala  Gln Pro Ser
    3365                3370                3375

Leu Arg  His Thr Tyr Gly Glu  Val Thr Trp Glu Gln  Leu Glu Ala
    3380                3385                3390

Gly Ile  Asn Arg Lys Gly Ala  Ala Gly Phe Leu Glu  Lys Lys Asn
    3395                3400                3405

Val Gly  Glu Val Leu Asp Ser  Glu Lys His Leu Val  Glu Gln Leu
    3410                3415                3420

Ile Arg  Asp Leu Lys Ala Gly  Arg Lys Ile Arg Tyr  Tyr Glu Thr
    3425                3430                3435

Ala Ile  Pro Lys Asn Glu Lys  Arg Asp Val Ser Asp  Asp Trp Gln
    3440                3445                3450

Ala Gly  Asp Leu Val Asp Glu  Lys Lys Pro Arg Val  Ile Gln Tyr
    3455                3460                3465

Pro Glu  Ala Lys Thr Arg Leu  Ala Ile Thr Lys Val  Met Tyr Asn
    3470                3475                3480

Trp Val  Lys Gln Gln Pro Val  Val Ile Pro Gly Tyr  Glu Gly Lys
    3485                3490                3495
```

```
Thr Pro  Leu Phe Asn Ile Phe  Asn Lys Val Arg Lys  Glu Trp Asp
    3500                 3505                 3510

Leu Phe  Asn Glu Pro Val Ala  Val Ser Phe Asp Thr  Lys Ala Trp
    3515                 3520                 3525

Asp Thr  Gln Val Thr Ser Lys  Asp Leu Arg Leu Ile  Gly Glu Ile
    3530                 3535                 3540

Gln Lys  Tyr Tyr Tyr Arg Lys  Glu Trp His Lys Phe  Ile Asp Thr
    3545                 3550                 3555

Ile Thr  Asp His Met Val Glu  Val Pro Val Ile Thr  Ala Asp Gly
    3560                 3565                 3570

Glu Val  Tyr Ile Arg Asn Gly  Gln Arg Gly Ser Gly  Gln Pro Asp
    3575                 3580                 3585

Thr Ser  Ala Gly Asn Ser Met  Leu Asn Val Leu Thr  Met Met Tyr
    3590                 3595                 3600

Ala Phe  Cys Glu Ser Thr Gly  Ile Pro Tyr Lys Ser  Phe Asn Arg
    3605                 3610                 3615

Val Ala  Arg Ile His Val Cys  Gly Asp Asp Gly Phe  Leu Ile Thr
    3620                 3625                 3630

Glu Arg  Gly Leu Gly Leu Lys  Phe Ala Asn Asn Gly  Met Gln Ile
    3635                 3640                 3645

Leu His  Glu Ala Gly Lys Pro  Gln Lys Ile Thr Glu  Gly Glu Arg
    3650                 3655                 3660

Met Lys  Val Ala Tyr Arg Phe  Glu Asp Ile Glu Phe  Cys Ser His
    3665                 3670                 3675

Thr Pro  Val Pro Val Arg Trp  Ser Asp Asn Thr Ser  Ser Tyr Met
    3680                 3685                 3690

Ala Gly  Arg Asp Thr Ala Ile  Ile Leu Ser Lys Met  Ala Thr Arg
    3695                 3700                 3705

Leu Asp  Ser Ser Gly Glu Arg  Gly Thr Thr Ala Tyr  Glu Lys Ala
    3710                 3715                 3720
```

```
Val Ala  Phe Ser Phe Leu Leu  Met Tyr Ser Trp Asn  Pro Leu Val
    3725                 3730                 3735

Arg Arg  Ile Cys Leu Leu Val  Leu Ser Gln Gln Pro  Glu Thr Ala
    3740                 3745                 3750

Pro Ser  Thr Gln Thr Thr Tyr  Tyr Tyr Lys Gly Asp  Pro Ile Gly
    3755                 3760                 3765

Ala Tyr  Lys Asp Val Ile Gly  Lys Asn Leu Ser Glu  Leu Lys Arg
    3770                 3775                 3780

Thr Gly  Phe Glu Lys Leu Ala  Asn Leu Asn Leu Ser  Leu Ser Thr
    3785                 3790                 3795

Leu Gly  Ile Trp Ser Lys His  Thr Ser Lys Arg Ile  Ile Gln Asp
    3800                 3805                 3810

Cys Val  Thr Ile Gly Lys Glu  Glu Gly Asn Trp Leu  Val Asn Ala
    3815                 3820                 3825

Asp Arg  Leu Ile Ser Ser Lys  Thr Gly His Leu Tyr  Ile Pro Asp
    3830                 3835                 3840

Lys Gly  Tyr Thr Leu Gln Gly  Lys His Tyr Glu Gln  Leu Gln Leu
    3845                 3850                 3855

Gln Ala  Arg Thr Ser Pro Ile  Met Gly Val Gly Thr  Glu Arg Tyr
    3860                 3865                 3870

Lys Leu  Gly Pro Ile Val Asn  Leu Leu Leu Arg Arg  Leu Lys Val
    3875                 3880                 3885

Leu Leu  Met Ala Ala Val Gly  Ala Ser Ser
    3890                 3895
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<210> 7
<211> 3913
<212> PRT
<213> BVDV

<400> 7

```
Met Glu Leu Phe Ser Asn Glu Leu Leu Tyr Lys Thr Tyr Lys Gln Lys
```

```
1               5                  10                  15

Pro Ala Gly Val Val Glu Pro Val Tyr Asp Val Asn Gly Arg Pro Leu
            20                  25                  30

Phe Gly Glu Ser Ser Asp Leu His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Gln Arg Gly Ser Ala Asn Ile Leu Thr Asn Ala Arg Ser Leu Pro
    50                  55                  60

Arg Lys Gly Asp Cys Arg Arg Gly Asn Val Tyr Gly Pro Val Ser Gly
65                  70                  75                  80

Ile Tyr Ile Lys Pro Gly Pro Ile Tyr Tyr Gln Asp Tyr Val Gly Pro
                85                  90                  95

Val Tyr His Arg Ala Pro Leu Glu Leu Cys Arg Glu Ala Ser Met Cys
            100                 105                 110

Glu Thr Thr Arg Arg Val Gly Arg Val Thr Gly Ser Asp Gly Lys Leu
        115                 120                 125

Tyr His Ile Tyr Ile Cys Ile Asp Gly Cys Ile Leu Leu Lys Arg Ala
    130                 135                 140

Thr Arg Asn Gln Pro Glu Val Leu Lys Trp Val Tyr Asn Arg Leu Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Glu Gly Ser Lys Gly Ala
                165                 170                 175

Thr Ser Lys Lys Gln Pro Lys Pro Asp Arg Ile Glu Lys Gly Lys Met
            180                 185                 190

Lys Ile Ala Pro Lys Glu Thr Glu Lys Asp Cys Lys Thr Arg Pro Pro
        195                 200                 205

Asp Ala Thr Ile Val Val Glu Gly Val Lys Tyr Gln Val Lys Lys Lys
    210                 215                 220

Gly Lys Val Arg Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys
225                 230                 235                 240
```

```
Asn Lys Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala
                245                 250                 255

Trp Ala Ile Leu Ala Ala Val Leu Leu Gln Leu Val Thr Gly Glu Asn
            260                 265                 270

Ile Thr Gln Trp Asn Leu Met Asp Asn Gly Thr Glu Gly Ile Gln Gln
        275                 280                 285

Ala Met Phe Leu Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro
    290                 295                 300

Glu Lys Ile Cys Thr Gly Val Pro Thr His Leu Ala Thr Asp Tyr Glu
305                 310                 315                 320

Leu Lys Glu Ile Val Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr
                325                 330                 335

Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys
            340                 345                 350

Asn Trp Phe His Ile Glu Pro Trp Ile Trp Leu Met Asn Lys Thr Gln
        355                 360                 365

Asn Asn Leu Thr Glu Gly Gln Pro Leu Arg Glu Cys Ala Val Thr Cys
    370                 375                 380

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

Arg Pro Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe
                405                 410                 415

Ala Gly Val Ile Leu Asp Gly Pro Cys Asn Phe Lys Val Ser Val Glu
            420                 425                 430

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

Ala Ile Gln Leu Leu Asp Gly Ala Thr Asn Thr Ile Glu Gly Ala Arg
    450                 455                 460

Val Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Lys Gln Leu Gly Ile
```

```
465                 470                 475                 480

Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Ala Trp Phe Gly Ala His
                485                 490                 495

Ala Ala Ser Pro Tyr Cys Gly Val Glu Arg Lys Ile Gly Tyr Val Trp
            500                 505                 510

Tyr Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Arg Asn Thr Arg Ile
        515                 520                 525

Ile Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu
    530                 535                 540

His Glu Met Gly Gly His Leu Ser Glu Phe Val Leu Leu Ser Leu Val
545                 550                 555                 560

Val Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Ile Tyr Leu Val
                565                 570                 575

Leu His Phe Ala Ile Pro Gln Ser His Val Asp Val Asp Thr Cys Asp
            580                 585                 590

Lys Asn Gln Leu Asn Leu Thr Val Ala Thr Thr Val Ala Glu Val Ile
        595                 600                 605

Pro Gly Thr Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro Asp
    610                 615                 620

Trp Trp Pro Tyr Glu Thr Thr Thr Val Phe Val Ile Glu Glu Ala Gly
625                 630                 635                 640

Gln Val Ile Lys Leu Met Leu Arg Ala Ile Arg Asp Leu Thr Arg Ile
                645                 650                 655

Trp Asn Ala Ala Thr Thr Thr Ala Phe Leu Ile Phe Leu Val Lys Ala
            660                 665                 670

Leu Arg Gly Gln Leu Ile Gln Gly Leu Leu Trp Leu Met Leu Ile Thr
        675                 680                 685

Gly Ala Gln Gly Phe Pro Glu Cys Lys Glu Gly Phe Gln Tyr Ala Ile
    690                 695                 700
```

```
Ser Lys Asp Arg Lys Met Gly Leu Leu Gly Pro Glu Ser Leu Thr Thr
705                 710                 715                 720

Thr Trp His Leu Pro Thr Lys Lys Ile Val Asp Ser Met Val His Val
                725                 730                 735

Trp Cys Glu Gly Lys Asp Leu Lys Ile Leu Lys Met Cys Thr Lys Glu
            740                 745                 750

Glu Arg Tyr Leu Val Ala Val His Glu Arg Ala Leu Ser Thr Ser Ala
        755                 760                 765

Glu Phe Met Gln Ile Ser Asp Gly Thr Ile Gly Pro Asp Val Ile Asp
    770                 775                 780

Met Pro Asp Asp Phe Glu Phe Gly Leu Cys Pro Cys Asp Ser Lys Pro
785                 790                 795                 800

Val Ile Lys Gly Lys Phe Asn Ala Ser Leu Leu Asn Gly Pro Ala Phe
                805                 810                 815

Gln Met Val Cys Pro Gln Gly Trp Thr Gly Thr Ile Glu Cys Thr Leu
            820                 825                 830

Ala Asn Gln Asp Thr Leu Asp Thr Thr Val Ile Arg Thr Tyr Arg Arg
        835                 840                 845

Thr Thr Pro Phe Gln Arg Arg Lys Trp Cys Thr Tyr Glu Lys Ile Ile
    850                 855                 860

Gly Glu Asp Ile Tyr Glu Cys Ile Leu Gly Gly Asn Trp Thr Cys Ile
865                 870                 875                 880

Thr Gly Asp His Ser Arg Leu Lys Asp Gly Pro Ile Lys Lys Cys Lys
                885                 890                 895

Trp Cys Gly His Asp Phe Val Asn Ser Glu Gly Leu Pro His Tyr Pro
            900                 905                 910

Ile Gly Lys Cys Met Leu Ile Asn Glu Ser Gly Tyr Arg Tyr Val Asp
        915                 920                 925

Asp Thr Ser Cys Asp Arg Gly Gly Val Ala Ile Val Pro Ser Gly Thr
```

```
    930                 935                 940

Val Lys Cys Arg Ile Gly Asn Val Thr Val Gln Val Ile Ala Thr Asn
945                 950                 955                 960

Asn Asp Leu Gly Pro Met Pro Cys Ser Pro Ala Glu Val Ile Ala Ser
                965                 970                 975

Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Ser Arg Thr
            980                 985                 990

Leu Pro Asn Lys Tyr Tyr Glu Pro  Arg Asp Arg Tyr Phe  Gln Gln Tyr
        995                 1000                1005

Met Leu  Lys Gly Glu Trp Gln  Tyr Trp Phe Asp Leu  Asp Ser Val
    1010                1015                1020

Asp His  His Lys Asp Tyr Phe  Ser Glu Phe Ile Ile  Ile Ala Val
    1025                1030                1035

Val Ala  Leu Leu Gly Gly Lys  Tyr Val Leu Trp Leu  Leu Ile Thr
    1040                1045                1050

Tyr Thr  Ile Leu Ser Glu Gln  Met Ala Met Gly Ala  Gly Val Asn
    1055                1060                1065

Thr Glu  Glu Ile Val Met Ile  Gly Asn Leu Leu Thr  Asp Ser Asp
    1070                1075                1080

Ile Glu  Val Val Val Tyr Phe  Leu Leu Leu Tyr Leu  Ile Val Lys
    1085                1090                1095

Glu Glu  Leu Ala Arg Lys Trp  Ile Ile Leu Val Tyr  His Ile Leu
    1100                1105                1110

Val Ala  Asn Pro Met Lys Thr  Ile Gly Val Val Leu  Leu Met Leu
    1115                1120                1125

Gly Gly  Val Val Lys Ala Ser  Arg Ile Asn Ala Asp  Asp Gln Ser
    1130                1135                1140

Ala Met  Asp Pro Cys Phe Leu  Leu Val Thr Gly Val  Val Ala Val
    1145                1150                1155
```

```
Leu Met  Ile Ala Arg Arg Glu  Pro Ala Thr Leu Pro  Leu Ile Val
    1160                 1165                 1170

Ala Leu  Leu Ala Ile Arg Thr  Ser Gly Phe Leu Leu  Pro Ala Ser
    1175                 1180                 1185

Ile Asp  Val Thr Val Ala Val  Val Leu Ile Val Leu  Leu Leu Ala
    1190                 1195                 1200

Ser Tyr  Ile Thr Asp Tyr Phe  Arg Tyr Lys Lys Trp  Leu Gln Leu
    1205                 1210                 1215

Leu Phe  Ser Leu Ile Ala Gly  Ile Phe Ile Ile Arg  Ser Leu Lys
    1220                 1225                 1230

His Ile  Asn Gln Met Glu Val  Pro Glu Ile Ser Met  Pro Ser Trp
    1235                 1240                 1245

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

Thr Thr  Asn Trp Asp Ile Asp  Leu Ala Gly Phe Leu  Leu Gln Trp
    1265                 1270                 1275

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

Thr Leu  Ile Ile Val Leu Pro  Ser Tyr Glu Leu Ser  Lys Leu Tyr
    1295                 1300                 1305

Phe Leu  Lys Asn Val Arg Thr  Asp Val Glu Lys Asn  Trp Leu Gly
    1310                 1315                 1320

Lys Val  Lys Tyr Arg Gln Ile  Ser Ser Val Tyr Asp  Ile Cys Asp
    1325                 1330                 1335

Ser Glu  Glu Ala Val Tyr Leu  Phe Pro Ser Arg His  Lys Ser Gly
    1340                 1345                 1350

Ser Arg  Pro Asp Phe Ile Leu  Pro Phe Leu Lys Ala  Val Leu Ile
    1355                 1360                 1365

Ser Cys  Ile Ser Ser Gln Trp  Gln Val Val Tyr Ile  Ser Tyr Leu
```

1370 1375 1380

Ile Leu Glu Ile Thr Tyr Tyr Met His Arg Lys Ile Ile Asp Glu
1385 1390 1395

Val Ser Gly Gly Ala Asn Phe Leu Ser Arg Leu Ile Ala Ala Ile
1400 1405 1410

Ile Glu Leu Asn Trp Ala Ile Asp Asp Glu Glu Cys Lys Gly Leu
1415 1420 1425

Lys Lys Leu Tyr Leu Leu Ser Gly Arg Val Lys Asn Leu Ile Val
1430 1435 1440

Lys His Lys Val Arg Asn Glu Ala Val His Arg Trp Phe Gly Glu
1445 1450 1455

Glu Glu Ile Tyr Gly Ala Pro Lys Val Ile Thr Ile Ile Lys Ala
1460 1465 1470

Ser Thr Leu Ser Lys Asn Arg His Cys Ile Ile Cys Thr Ile Cys
1475 1480 1485

Glu Gly Lys Glu Trp Asn Gly Ala Asn Cys Pro Lys Cys Gly Arg
1490 1495 1500

Gln Gly Lys Pro Ile Thr Cys Gly Met Thr Leu Ala Asp Phe Glu
1505 1510 1515

Glu Lys His Tyr Lys Lys Ile Phe Ile Arg Glu Glu Ser Ser Cys
1520 1525 1530

Pro Val Pro Phe Asp Pro Ser Cys His Cys Asn Tyr Phe Arg His
1535 1540 1545

Asp Gly Pro Phe Arg Lys Glu Tyr Lys Gly Tyr Val Gln Tyr Thr
1550 1555 1560

Ala Arg Gly Gln Leu Phe Leu Arg Asn Leu Pro Ile Leu Ala Thr
1565 1570 1575

Lys Met Lys Leu Leu Met Val Gly Asn Leu Gly Ala Glu Ile Gly
1580 1585 1590

```
Asp Leu  Glu His Leu Gly Trp  Val Leu Arg Gly Pro  Ala Val Cys
    1595                 1600                 1605

Lys Lys  Ile Thr Asn His Glu  Lys Cys His Val Asn  Ile Met Asp
    1610                 1615                 1620

Lys Leu  Thr Ala Phe Phe Gly  Ile Met Pro Arg Gly  Thr Thr Pro
    1625                 1630                 1635

Arg Ala  Pro Val Arg Phe Pro  Thr Ala Leu Leu Lys  Val Arg Arg
    1640                 1645                 1650

Gly Leu  Glu Thr Gly Trp Ala  Tyr Thr His Gln Gly  Gly Ile Ser
    1655                 1660                 1665

Ser Val  Asp His Val Thr Ala  Gly Lys Asp Leu Leu  Val Cys Asp
    1670                 1675                 1680

Ser Met  Gly Arg Thr Arg Val  Val Cys His Ser Asn  Asn Lys Met
    1685                 1690                 1695

Thr Asp  Glu Thr Glu Tyr Gly  Ile Lys Thr Asp Ser  Gly Cys Pro
    1700                 1705                 1710

Glu Gly  Ala Arg Cys Tyr Val  Leu Asn Pro Glu Ala  Val Asn Ile
    1715                 1720                 1725

Ser Gly  Thr Lys Gly Ala Met  Val His Leu Gln Lys  Thr Gly Gly
    1730                 1735                 1740

Glu Phe  Thr Cys Val Thr Ala  Ser Gly Thr Pro Ala  Phe Phe Asp
    1745                 1750                 1755

Leu Lys  Asn Leu Lys Gly Trp  Ser Gly Leu Pro Ile  Phe Glu Ala
    1760                 1765                 1770

Ser Ser  Gly Arg Val Val Gly  Arg Val Lys Val Gly  Lys Asn Glu
    1775                 1780                 1785

Asp Ser  Lys Pro Thr Lys Leu  Met Ser Gly Ile Gln  Thr Val Ser
    1790                 1795                 1800

Lys Asn  Gln Thr Asp Leu Ala  Asp Ile Val Lys Lys  Leu Thr Ser
```

1805 1810 1815

Met Asn Arg Gly Glu Phe Lys Gln Ile Thr Leu Ala Thr Gly Ala
1820 1825 1830

Gly Lys Thr Thr Glu Leu Pro Arg Ser Val Ile Glu Glu Ile Gly
1835 1840 1845

Arg His Lys Arg Val Leu Val Leu Ile Pro Leu Arg Ala Ala Ala
1850 1855 1860

Glu Ser Val Tyr Gln Tyr Met Arg Val Lys Tyr Pro Ser Ile Ser
1865 1870 1875

Phe Asn Leu Arg Ile Gly Asp Met Lys Glu Gly Asp Met Ala Thr
1880 1885 1890

Gly Ile Thr Tyr Ala Ser Tyr Gly Tyr Phe Cys Gln Leu Pro Gln
1895 1900 1905

Pro Lys Leu Arg Ala Ala Met Val Glu Tyr Ser Tyr Ile Phe Leu
1910 1915 1920

Asp Glu Tyr His Cys Ala Thr Pro Glu Gln Leu Ala Ile Ile Gly
1925 1930 1935

Lys Ile His Arg Phe Ala Glu Asn Leu Arg Val Val Ala Met Thr
1940 1945 1950

Ala Thr Pro Ala Gly Thr Val Thr Thr Thr Gly Gln Lys His Pro
1955 1960 1965

Ile Glu Glu Phe Ile Ala Pro Glu Val Met Lys Gly Glu Asp Leu
1970 1975 1980

Gly Ser Glu Tyr Leu Asp Ile Ala Gly Leu Lys Ile Pro Thr Glu
1985 1990 1995

Glu Met Lys Gly Asn Met Leu Val Phe Ala Pro Thr Arg Asn Met
2000 2005 2010

Ala Val Glu Thr Ala Lys Lys Leu Lys Ala Lys Gly Tyr Asn Ser
2015 2020 2025

```
Gly Tyr  Tyr Tyr Ser Gly Glu  Asn Pro Glu Asn Leu  Arg Val Val
    2030                 2035                 2040

Thr Ser  Gln Ser Pro Tyr Val  Val Val Ala Thr Asn  Ala Ile Glu
    2045                 2050                 2055

Ser Gly  Val Thr Leu Pro Asp  Leu Asp Thr Val Val  Asp Thr Gly
    2060                 2065                 2070

Leu Lys  Cys Glu Lys Arg Val  Arg Ile Ser Ser Lys  Met Pro Phe
    2075                 2080                 2085

Ile Val  Thr Gly Leu Lys Arg  Met Ala Val Thr Ile  Gly Glu Gln
    2090                 2095                 2100

Ala Gln  Arg Arg Gly Arg Val  Gly Arg Val Lys Pro  Gly Arg Tyr
    2105                 2110                 2115

Tyr Arg  Ser Gln Glu Thr Ala  Ser Gly Ser Lys Asp  Tyr His Tyr
    2120                 2125                 2130

Asp Leu  Leu Gln Ala Gln Arg  Tyr Gly Ile Glu Asp  Gly Ile Asn
    2135                 2140                 2145

Val Thr  Lys Ser Phe Arg Glu  Met Asn Tyr Asp Trp  Ser Leu Tyr
    2150                 2155                 2160

Glu Glu  Asp Ser Leu Met Ile  Thr Gln Leu Glu Val  Leu Asn Asn
    2165                 2170                 2175

Leu Leu  Ile Ser Glu Asp Leu  Pro Ala Ala Val Lys  Asn Ile Met
    2180                 2185                 2190

Ala Arg  Thr Asp His Pro Glu  Pro Ile Gln Leu Ala  Tyr Asn Ser
    2195                 2200                 2205

Tyr Glu  Asn Gln Ile Pro Val  Leu Phe Pro Lys Ile  Lys Asn Gly
    2210                 2215                 2220

Glu Val  Thr Asp Ser Tyr Glu  Asn Tyr Thr Tyr Leu  Asn Ala Arg
    2225                 2230                 2235

Lys Leu  Gly Glu Asp Val Pro  Ala Tyr Val Tyr Ala  Thr Glu Asp
```

2240 2245 2250

Glu Asp Leu Ala Val Asp Leu Leu Gly Met Asp Trp Pro Asp Pro
2255 2260 2265

Gly Asn Gln Gln Val Val Glu Thr Gly Arg Ala Leu Lys Gln Val
2270 2275 2280

Thr Gly Leu Ser Thr Ala Glu Asn Ala Leu Leu Ile Ala Leu Phe
2285 2290 2295

Gly Tyr Val Gly Tyr Gln Thr Leu Ser Lys Arg His Ile Pro Met
2300 2305 2310

Ile Thr Asp Ile Tyr Thr Leu Glu Asp His Arg Leu Glu Asp Thr
2315 2320 2325

Thr His Leu Gln Phe Ala Pro Asn Ala Ile Arg Thr Asp Gly Lys
2330 2335 2340

Asp Ser Glu Leu Lys Glu Leu Ala Val Gly Asp Leu Asp Lys Tyr
2345 2350 2355

Val Asp Ala Leu Val Asp Tyr Ser Lys Gln Gly Met Lys Phe Ile
2360 2365 2370

Lys Val Gln Ala Glu Lys Val Arg Asp Ser Gln Ser Thr Lys Glu
2375 2380 2385

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

Leu Thr Glu Asn Lys Glu Glu Ile Ile Arg Tyr Gly Leu Trp Gly
2405 2410 2415

Val His Thr Ala Leu Tyr Lys Ser Leu Ala Ala Arg Leu Gly His
2420 2425 2430

Glu Thr Ala Phe Ala Thr Leu Val Val Lys Trp Leu Ala Phe Gly
2435 2440 2445

Gly Glu Thr Val Ser Ala His Ile Lys Gln Val Ala Val Asp Leu
2450 2455 2460

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Val Val  Tyr Tyr Ile Ile Asn  Lys Pro Ser Phe Pro  Gly Asp Thr
    2465                 2470                 2475

Glu Thr  Gln Gln Glu Gly Arg  Arg Phe Val Ala Ser  Leu Phe Ile
    2480                 2485                 2490

Ser Ala  Leu Ala Thr Tyr Thr  Tyr Lys Thr Trp Asn  Tyr Asn Asn
    2495                 2500                 2505

Leu Gln  Arg Val Val Glu Pro  Ala Leu Ala Tyr Leu  Pro Tyr Ala
    2510                 2515                 2520

Thr Ser  Ala Leu Lys Leu Phe  Thr Pro Thr Arg Leu  Glu Ser Val
    2525                 2530                 2535

Val Ile  Leu Ser Ser Thr Ile  Tyr Lys Thr Tyr Leu  Ser Ile Arg
    2540                 2545                 2550

Lys Gly  Lys Ser Asp Gly Leu  Leu Gly Thr Gly Ile  Ser Ala Ala
    2555                 2560                 2565

Met Glu  Ile Leu Asn Gln Asn  Pro Ile Ser Val Gly  Ile Ser Val
    2570                 2575                 2580

Met Leu  Gly Val Gly Ala Ile  Ala Ala His Asn Ala  Ile Glu Ser
    2585                 2590                 2595

Ser Glu  Gln Lys Arg Thr Leu  Leu Met Lys Val Phe  Val Lys Asn
    2600                 2605                 2610

Phe Leu  Asp Gln Ala Ala Thr  Asp Glu Leu Val Lys  Glu Asn Pro
    2615                 2620                 2625

Glu Lys  Ile Ile Met Ala Leu  Phe Glu Ala Val Gln  Thr Ile Gly
    2630                 2635                 2640

Asn Pro  Leu Arg Leu Ile Tyr  His Leu Tyr Gly Val  Tyr Tyr Lys
    2645                 2650                 2655

Gly Trp  Glu Ala Lys Glu Leu  Ala Glu Lys Thr Ala  Gly Arg Asn
    2660                 2665                 2670

Leu Phe  Thr Leu Ile Met Phe  Glu Ala Phe Glu Leu  Leu Gly Met
```

2675 2680 2685

Asp Ser Glu Gly Lys Ile Arg Asn Leu Ser Gly Asn Tyr Ile Leu
2690 2695 2700

Asp Leu Ile Phe Asn Leu His Asn Lys Leu Asn Lys Gly Leu Lys
2705 2710 2715

Lys Leu Val Leu Gly Trp Ala Pro Ala Pro Leu Ser Cys Asp Trp
2720 2725 2730

Thr Pro Ser Asp Glu Arg Ile Ser Leu Pro His Asn Asn Tyr Leu
2735 2740 2745

Arg Val Glu Thr Arg Cys Pro Cys Gly Tyr Glu Met Lys Ala Ile
2750 2755 2760

Lys Asn Val Ala Gly Lys Leu Thr Lys Val Glu Glu Lys Gly Ser
2765 2770 2775

Phe Leu Cys Arg Asn Arg Leu Gly Arg Gly Pro Pro Asn Phe Lys
2780 2785 2790

Val Thr Lys Phe Tyr Asp Asp Asn Leu Ile Glu Val Lys Pro Val
2795 2800 2805

Ala Arg Leu Glu Gly Gln Val Asp Leu Tyr Tyr Lys Gly Val Thr
2810 2815 2820

Ala Lys Leu Asp Tyr Asn Asn Gly Lys Val Leu Leu Ala Thr Asn
2825 2830 2835

Lys Trp Glu Val Asp His Ala Phe Leu Thr Arg Leu Val Lys Lys
2840 2845 2850

His Thr Gly Ile Gly Phe Lys Gly Ala Tyr Leu Gly Asp Arg Pro
2855 2860 2865

Asp His Gln Asp Leu Val Asp Arg Asp Cys Ala Thr Ile Thr Lys
2870 2875 2880

Asn Ser Val Gln Phe Leu Lys Met Lys Lys Gly Cys Ala Phe Thr
2885 2890 2895

```
Tyr Asp  Leu Thr Ile Ser Asn  Leu Val Arg Leu Ile  Glu Leu Val
    2900                 2905                 2910

His Lys  Asn Asn Leu Gln Glu  Arg Glu Ile Pro Thr  Val Thr Val
    2915                 2920                 2925

Thr Thr  Trp Leu Ala Tyr Ser  Phe Val Asn Glu Asp  Leu Gly Thr
    2930                 2935                 2940

Ile Lys  Pro Val Leu Gly Glu  Lys Val Ile Pro Glu  Pro Pro Glu
    2945                 2950                 2955

Glu Leu  Ser Leu Gln Pro Thr  Val Arg Leu Val Thr  Thr Glu Thr
    2960                 2965                 2970

Ala Ile  Thr Ile Thr Gly Glu  Ala Glu Val Met Thr  Thr Gly Ile
    2975                 2980                 2985

Thr Pro  Val Val Glu Met Lys  Glu Glu Pro Gln Leu  Asp His Gln
    2990                 2995                 3000

Ser Thr  Thr Leu Lys Val Gly  Leu Lys Glu Gly Glu  Tyr Pro Gly
    3005                 3010                 3015

Pro Gly  Val Asn Pro Asn His  Leu Ala Glu Val Ile  Asp Glu Lys
    3020                 3025                 3030

Asp Asp  Arg Pro Phe Val Leu  Ile Ile Gly Asn Lys  Gly Ser Thr
    3035                 3040                 3045

Ser Asn  Arg Ala Arg Thr Ala  Lys Asn Ile Arg Leu  Tyr Lys Gly
    3050                 3055                 3060

Asn Asn  Pro Arg Glu Ile Arg  Asp Leu Met Ser Gln  Gly Arg Ile
    3065                 3070                 3075

Leu Thr  Val Ala Leu Lys Glu  Leu Asp Pro Glu Leu  Lys Glu Leu
    3080                 3085                 3090

Val Asp  Tyr Lys Gly Thr Phe  Leu Asn Arg Glu Ala  Leu Glu Ala
    3095                 3100                 3105

Leu Ser  Leu Gly Lys Pro Ile  Lys Arg Lys Thr Thr  Thr Ala Met
```

3110 3115 3120

Ile Arg Arg Leu Ile Glu Pro Glu Val Glu Glu Glu Leu Pro Asp
3125 3130 3135

Trp Phe Gln Ala Glu Glu Pro Leu Phe Leu Glu Ala Lys Ile Gln
3140 3145 3150

Asn Asp Leu Tyr His Leu Ile Gly Ser Val Asp Ser Ile Lys Ser
3155 3160 3165

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

Glu Val Gly Ala Arg Thr Tyr Thr Met Lys Leu Ser Ser Trp Ser
3185 3190 3195

Thr Gln Val Thr Lys Lys Gln Met Ser Leu Ala Pro Leu Phe Glu
3200 3205 3210

Glu Leu Leu Leu Lys Cys Pro Pro Cys Ser Lys Ile Ser Lys Gly
3215 3220 3225

His Met Val Ser Ala Tyr Gln Leu Ala Gln Gly Asn Trp Glu Pro
3230 3235 3240

Leu Gly Cys Gly Val Tyr Met Gly Thr Ile Pro Ala Arg Arg Leu
3245 3250 3255

Lys Ile His Pro Tyr Glu Ala Tyr Leu Lys Leu Lys Glu Leu Val
3260 3265 3270

Glu Val Glu Ser Ser Arg Ala Thr Ala Lys Glu Ser Ile Ile Arg
3275 3280 3285

Glu His Asn Thr Trp Ile Leu Arg Lys Val Arg His Glu Gly Asn
3290 3295 3300

Leu Arg Thr Lys Ser Met Ile Asn Pro Gly Lys Ile Ser Asp Gln
3305 3310 3315

Leu Cys Arg Asp Gly His Lys Arg Asn Ile Tyr Asn Lys Ile Ile
3320 3325 3330

```
Gly Ser  Thr Met Ala Ser Ala  Gly Ile Arg Leu Glu  Lys Leu Pro
    3335                 3340                 3345

Val Val  Arg Ala Gln Thr Asp  Thr Thr Ser Phe His  Gln Ala Ile
    3350                 3355                 3360

Arg Glu  Lys Ile Asp Lys Thr  Glu Asn Lys Gln Thr  Pro Glu Leu
    3365                 3370                 3375

His Glu  Glu Leu Met Lys Val  Phe Asp Cys Leu Lys  Ile Pro Glu
    3380                 3385                 3390

Leu Lys  Glu Ser Tyr Asp Glu  Val Ser Trp Glu Gln  Leu Glu Ala
    3395                 3400                 3405

Gly Ile  Asn Arg Lys Gly Ala  Ala Gly Tyr Leu Glu  Ser Lys Asn
    3410                 3415                 3420

Ile Gly  Glu Val Leu Asp Thr  Glu Lys His Ile Val  Glu Gln Leu
    3425                 3430                 3435

Ile Lys  Asp Leu Arg Lys Gly  Lys Lys Ile Arg Tyr  Tyr Glu Thr
    3440                 3445                 3450

Ala Ile  Pro Lys Asn Glu Lys  Arg Asp Val Ser Asp  Asp Trp Glu
    3455                 3460                 3465

Ala Gly  Glu Phe Val Asp Glu  Lys Lys Pro Arg Val  Ile Gln Tyr
    3470                 3475                 3480

Pro Asp  Ala Lys Val Arg Leu  Ala Ile Thr Lys Val  Met Tyr Lys
    3485                 3490                 3495

Trp Val  Lys Gln Lys Pro Val  Val Ile Pro Gly Tyr  Glu Gly Lys
    3500                 3505                 3510

Thr Pro  Leu Phe Asp Ile Phe  Asn Lys Val Lys Lys  Glu Trp Asp
    3515                 3520                 3525

Ser Phe  Gln Asp Pro Val Ala  Val Ser Phe Asp Thr  Lys Ala Trp
    3530                 3535                 3540

Asp Thr  Gln Val Thr Ser Arg  Asp Leu Met Leu Ile  Lys Asp Ile
```

3545 3550 3555

Gln Lys Tyr Tyr Phe Lys Arg Ser Ile His Lys Phe Leu Asp Thr
3560 3565 3570

Ile Thr Glu His Met Val Glu Val Pro Val Ile Thr Ala Asp Gly
3575 3580 3585

Glu Val Tyr Ile Arg Asn Gly Gln Arg Gly Ser Gly Gln Pro Asp
3590 3595 3600

Thr Ser Ala Gly Asn Ser Met Leu Asn Val Leu Thr Met Ile Tyr
3605 3610 3615

Ala Phe Cys Lys Ser Thr Gly Ile Pro Tyr Arg Gly Phe Ser Arg
3620 3625 3630

Val Ala Arg Ile His Val Cys Gly Asp Asp Gly Phe Leu Ile Thr
3635 3640 3645

Glu Arg Gly Leu Gly Leu Lys Phe Ser Glu Lys Gly Met Gln Ile
3650 3655 3660

Leu His Glu Ala Gly Lys Pro Gln Lys Ile Thr Glu Gly Asp Lys
3665 3670 3675

Met Lys Val Ala Tyr Arg Phe Glu Asp Ile Glu Phe Cys Ser His
3680 3685 3690

Thr Pro Val Pro Val Arg Trp Ala Asp Asn Thr Ser Ser Tyr Met
3695 3700 3705

Ala Gly Arg Ser Thr Ala Thr Ile Leu Ala Lys Met Ala Thr Arg
3710 3715 3720

Leu Asp Ser Ser Gly Glu Arg Gly Ser Thr Ala Tyr Glu Lys Ala
3725 3730 3735

Val Ala Phe Ser Phe Leu Leu Met Tyr Ser Trp Asn Pro Val Val
3740 3745 3750

Arg Arg Ile Cys Leu Leu Val Leu Ser Gln Phe Pro Glu Ile Ser
3755 3760 3765

```
Pro Ser  Lys Asn Thr Ile Tyr  Tyr Tyr Gln Gly Asp  Pro Ile Ala
    3770                 3775                 3780

Ala Tyr  Arg Glu Val Ile Gly  Lys Gln Leu Cys Glu  Leu Lys Arg
    3785                 3790                 3795

Thr Gly  Phe Glu Lys Leu Ala  Gly Leu Asn Leu Ser  Met Thr Thr
    3800                 3805                 3810

Leu Gly  Ile Trp Thr Lys His  Thr Ser Lys Arg Leu  Ile Gln Asp
    3815                 3820                 3825

Cys Val  Glu Ile Gly Lys Arg  Glu Gly Asn Trp Leu  Val Asn Ala
    3830                 3835                 3840

Asp Arg  Leu Ile Ala Gly Lys  Thr Gly Lys Phe Tyr  Ile Pro Ser
    3845                 3850                 3855

Thr Gly  Val Thr Leu Leu Gly  Lys His Tyr Glu Glu  Ile Asn Leu
    3860                 3865                 3870

Lys Gln  Lys Ala Ala Gln Pro  Pro Ile Glu Gly Val  Asp Arg Tyr
    3875                 3880                 3885

Lys Leu  Gly Pro Ile Val Asn  Val Ile Leu Arg Arg  Leu Arg Val
    3890                 3895                 3900

Met Leu  Met Thr Val Ala Ser  Gly Ser Trp
    3905                 3910
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<211> 3912
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<400> 8

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Met Glu Leu Phe Ser Asn Glu Leu Leu Tyr Lys Thr Tyr Lys Gln Lys
1               5                  10                  15

Pro Ala Gly Val Val Glu Pro Val Tyr Asp Val Asn Gly Arg Pro Leu
            20                  25                  30

Phe Gly Glu Ser Ser Asp Leu His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45
```

```
His Gln Arg Gly Ser Ala Asn Ile Leu Thr Asn Ala Arg Ser Leu Pro
    50                  55                  60

Arg Lys Gly Asp Cys Arg Arg Gly Asn Val Tyr Gly Pro Val Ser Gly
65                  70                  75                  80

Ile Tyr Ile Lys Pro Gly Pro Ile Tyr Tyr Gln Asp Tyr Val Gly Pro
                85                  90                  95

Val Tyr His Arg Ala Pro Leu Glu Leu Cys Arg Glu Ala Ser Met Cys
            100                 105                 110

Glu Thr Thr Arg Arg Val Gly Arg Val Thr Gly Ser Asp Gly Lys Leu
        115                 120                 125

Tyr His Ile Tyr Ile Cys Ile Asp Gly Cys Ile Leu Leu Lys Arg Ala
    130                 135                 140

Thr Arg Asn Gln Pro Glu Val Leu Lys Trp Val Tyr Asn Arg Leu Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Glu Gly Ser Lys Gly Ala
                165                 170                 175

Thr Ser Lys Lys Gln Pro Lys Pro Asp Arg Ile Glu Lys Gly Lys Met
            180                 185                 190

Lys Ile Ala Pro Lys Glu Thr Glu Lys Asp Cys Lys Thr Arg Pro Pro
        195                 200                 205

Asp Ala Thr Ile Val Val Glu Gly Val Lys Tyr Gln Val Lys Lys Lys
    210                 215                 220

Gly Lys Val Arg Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys
225                 230                 235                 240

Asn Lys Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala
                245                 250                 255

Trp Ala Ile Leu Ala Ala Val Leu Leu Gln Leu Val Thr Gly Glu Asn
            260                 265                 270
```

```
Ile Thr Gln Trp Asn Leu Met Asp Asn Gly Thr Glu Gly Ile Gln Gln
        275                 280                 285

Ala Met Phe Leu Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro
    290                 295                 300

Glu Lys Ile Cys Thr Gly Val Pro Thr His Leu Ala Thr Asp Tyr Glu
305                 310                 315                 320

Leu Lys Glu Ile Val Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr
                325                 330                 335

Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys
            340                 345                 350

Asn Trp Phe His Ile Glu Pro Trp Ile Trp Leu Met Asn Lys Thr Gln
        355                 360                 365

Asn Asn Leu Thr Glu Gly Gln Pro Leu Arg Glu Cys Ala Val Thr Cys
    370                 375                 380

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

Arg Pro Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe
                405                 410                 415

Ala Gly Val Ile Leu Asp Gly Pro Cys Asn Phe Lys Val Ser Val Glu
            420                 425                 430

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

Ile Gln Leu Leu Asp Gly Ala Thr Asn Thr Ile Glu Gly Ala Arg Val
    450                 455                 460

Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Lys Gln Leu Gly Ile Leu
465                 470                 475                 480

Gly Lys Lys Leu Glu Asn Lys Ser Lys Ala Trp Phe Gly Ala His Ala
                485                 490                 495

Ala Ser Pro Tyr Cys Gly Val Glu Arg Lys Ile Gly Tyr Val Trp Tyr
            500                 505                 510
```

```
Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Arg Asn Thr Arg Ile Ile
        515                 520                 525

Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His
    530                 535                 540

Glu Met Gly Gly His Leu Ser Glu Phe Val Leu Leu Ser Leu Val Val
545                 550                 555                 560

Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Ile Tyr Leu Val Leu
                565                 570                 575

His Phe Ala Ile Pro Gln Ser His Val Asp Val Asp Thr Cys Asp Lys
            580                 585                 590

Asn Gln Leu Asn Leu Thr Val Ala Thr Thr Val Ala Glu Val Ile Pro
        595                 600                 605

Gly Thr Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro Asp Trp
    610                 615                 620

Trp Pro Tyr Glu Thr Thr Thr Val Phe Val Ile Glu Glu Ala Gly Gln
625                 630                 635                 640

Val Ile Lys Leu Met Leu Arg Ala Ile Arg Asp Leu Thr Arg Ile Trp
                645                 650                 655

Asn Ala Ala Thr Thr Thr Ala Phe Leu Ile Phe Leu Val Lys Ala Leu
            660                 665                 670

Arg Gly Gln Leu Ile Gln Gly Leu Leu Trp Leu Met Leu Ile Thr Gly
        675                 680                 685

Ala Gln Gly Phe Pro Glu Cys Lys Glu Gly Phe Gln Tyr Ala Ile Ser
    690                 695                 700

Lys Asp Arg Lys Met Gly Leu Leu Gly Pro Glu Ser Leu Thr Thr Thr
705                 710                 715                 720

Trp His Leu Pro Thr Lys Lys Ile Val Asp Ser Met Val His Val Trp
                725                 730                 735
```

```
Cys Glu Gly Lys Asp Leu Lys Ile Leu Lys Met Cys Thr Lys Glu Glu
            740                 745                 750

Arg Tyr Leu Val Ala Val His Glu Arg Ala Leu Ser Thr Ser Ala Glu
        755                 760                 765

Phe Met Gln Ile Ser Asp Gly Thr Ile Gly Pro Asp Val Ile Asp Met
    770                 775                 780

Pro Asp Asp Phe Glu Phe Gly Leu Cys Pro Cys Asp Ser Lys Pro Val
785                 790                 795                 800

Ile Lys Gly Lys Phe Asn Ala Ser Leu Leu Asn Gly Pro Ala Phe Gln
                805                 810                 815

Met Val Cys Pro Gln Gly Trp Thr Gly Thr Ile Glu Cys Thr Leu Ala
            820                 825                 830

Asn Gln Asp Thr Leu Asp Thr Thr Val Ile Arg Thr Tyr Arg Arg Thr
        835                 840                 845

Thr Pro Phe Gln Arg Arg Lys Trp Cys Thr Tyr Glu Lys Ile Ile Gly
    850                 855                 860

Glu Asp Ile Tyr Glu Cys Ile Leu Gly Gly Asn Trp Thr Cys Ile Thr
865                 870                 875                 880

Gly Asp His Ser Arg Leu Lys Asp Gly Pro Ile Lys Lys Cys Lys Trp
                885                 890                 895

Cys Gly His Asp Phe Val Asn Ser Glu Gly Leu Pro His Tyr Pro Ile
            900                 905                 910

Gly Lys Cys Met Leu Ile Asn Glu Ser Gly Tyr Arg Tyr Val Asp Asp
        915                 920                 925

Thr Ser Cys Asp Arg Gly Gly Val Ala Ile Val Pro Ser Gly Thr Val
    930                 935                 940

Lys Cys Arg Ile Gly Asn Val Thr Val Gln Val Ile Ala Thr Asn Asn
945                 950                 955                 960

Asp Leu Gly Pro Met Pro Cys Ser Pro Ala Glu Val Ile Ala Ser Glu
                965                 970                 975
```

```
Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Ser Arg Thr Leu
            980                 985                 990

Pro Asn Lys Tyr Tyr Glu Pro Arg  Asp Arg Tyr Phe Gln  Gln Tyr Met
        995                 1000                1005

Leu Lys  Gly Glu Trp Gln Tyr  Trp Phe Asp Leu Asp  Ser Val Asp
    1010                1015                1020

His His  Lys Asp Tyr Phe Ser  Glu Phe Ile Ile Ile  Ala Val Val
    1025                1030                1035

Ala Leu  Leu Gly Gly Lys Tyr  Val Leu Trp Leu Leu  Ile Thr Tyr
    1040                1045                1050

Thr Ile  Leu Ser Glu Gln Met  Ala Met Gly Ala Gly  Val Asn Thr
    1055                1060                1065

Glu Glu  Ile Val Met Ile Gly  Asn Leu Leu Thr Asp  Ser Asp Ile
    1070                1075                1080

Glu Val  Val Val Tyr Phe Leu  Leu Leu Tyr Leu Ile  Val Lys Glu
    1085                1090                1095

Glu Leu  Ala Arg Lys Trp Ile  Ile Leu Val Tyr His  Ile Leu Val
    1100                1105                1110

Ala Asn  Pro Met Lys Thr Ile  Gly Val Val Leu Leu  Met Leu Gly
    1115                1120                1125

Gly Val  Val Lys Ala Ser Arg  Ile Asn Ala Asp Asp  Gln Ser Ala
    1130                1135                1140

Met Asp  Pro Cys Phe Leu Leu  Val Thr Gly Val Val  Ala Val Leu
    1145                1150                1155

Met Ile  Ala Arg Arg Glu Pro  Ala Thr Leu Pro Leu  Ile Val Ala
    1160                1165                1170

Leu Leu  Ala Ile Arg Thr Ser  Gly Phe Leu Leu Pro  Ala Ser Ile
    1175                1180                1185
```

```
Asp Val  Thr Val Ala Val Val  Leu Ile Val Leu Leu  Leu Ala Ser
    1190                 1195                 1200

Tyr Ile  Thr Asp Tyr Phe Arg  Tyr Lys Lys Trp Leu  Gln Leu Leu
    1205                 1210                 1215

Phe Ser  Leu Ile Ala Gly Ile  Phe Ile Ile Arg Ser  Leu Lys His
    1220                 1225                 1230

Ile Asn  Gln Met Glu Val Pro  Glu Ile Ser Met Pro  Ser Trp Arg
    1235                 1240                 1245

Pro Leu  Ala Leu Val Leu Phe  Tyr Ile Thr Ser Thr  Ala Ile Thr
    1250                 1255                 1260

Thr Asn  Trp Asp Ile Asp Leu  Ala Gly Phe Leu Leu  Gln Trp Ala
    1265                 1270                 1275

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

Leu Ile  Ile Val Leu Pro Ser  Tyr Glu Leu Ser Lys  Leu Tyr Phe
    1295                 1300                 1305

Leu Lys  Asn Val Arg Thr Asp  Val Glu Lys Asn Trp  Leu Gly Lys
    1310                 1315                 1320

Val Lys  Tyr Arg Gln Ile Ser  Ser Val Tyr Asp Ile  Cys Asp Ser
    1325                 1330                 1335

Glu Glu  Ala Val Tyr Leu Phe  Pro Ser Arg His Lys  Ser Gly Ser
    1340                 1345                 1350

Arg Pro  Asp Phe Ile Leu Pro  Phe Leu Lys Ala Val  Leu Ile Ser
    1355                 1360                 1365

Cys Ile  Ser Ser Gln Trp Gln  Val Val Tyr Ile Ser  Tyr Leu Ile
    1370                 1375                 1380

Leu Glu  Ile Thr Tyr Tyr Met  His Arg Lys Ile Ile  Asp Glu Val
    1385                 1390                 1395

Ser Gly  Gly Ala Asn Phe Leu  Ser Arg Leu Ile Ala  Ala Ile Ile
    1400                 1405                 1410
```

```
Glu Leu  Asn Trp Ala Ile Asp  Asp Glu Glu Cys Lys  Gly Leu Lys
    1415                 1420                 1425

Lys Leu  Tyr Leu Leu Ser Gly  Arg Val Lys Asn Leu  Ile Val Lys
    1430                 1435                 1440

His Lys  Val Arg Asn Glu Ala  Val His Arg Trp Phe  Gly Glu Glu
    1445                 1450                 1455

Glu Ile  Tyr Gly Ala Pro Lys  Val Ile Thr Ile Ile  Lys Ala Ser
    1460                 1465                 1470

Thr Leu  Ser Lys Asn Arg His  Cys Ile Ile Cys Thr  Ile Cys Glu
    1475                 1480                 1485

Gly Lys  Glu Trp Asn Gly Ala  Asn Cys Pro Lys Cys  Gly Arg Gln
    1490                 1495                 1500

Gly Lys  Pro Ile Thr Cys Gly  Met Thr Leu Ala Asp  Phe Glu Glu
    1505                 1510                 1515

Lys His  Tyr Lys Lys Ile Phe  Ile Arg Glu Glu Ser  Ser Cys Pro
    1520                 1525                 1530

Val Pro  Phe Asp Pro Ser Cys  His Cys Asn Tyr Phe  Arg His Asp
    1535                 1540                 1545

Gly Pro  Phe Arg Lys Glu Tyr  Lys Gly Tyr Val Gln  Tyr Thr Ala
    1550                 1555                 1560

Arg Gly  Gln Leu Phe Leu Arg  Asn Leu Pro Ile Leu  Ala Thr Lys
    1565                 1570                 1575

Met Lys  Leu Leu Met Val Gly  Asn Leu Gly Ala Glu  Ile Gly Asp
    1580                 1585                 1590

Leu Glu  His Leu Gly Trp Val  Leu Arg Gly Pro Ala  Val Cys Lys
    1595                 1600                 1605

Lys Ile  Thr Asn His Glu Lys  Cys His Val Asn Ile  Met Asp Lys
    1610                 1615                 1620
```

```
Leu Thr  Ala Phe Phe Gly Ile  Met Pro Arg Gly Thr  Thr Pro Arg
    1625                 1630                 1635

Ala Pro  Val Arg Phe Pro Thr  Ala Leu Leu Lys Val  Arg Arg Gly
    1640                 1645                 1650

Leu Glu  Thr Gly Trp Ala Tyr  Thr His Gln Gly Gly  Ile Ser Ser
    1655                 1660                 1665

Val Asp  His Val Thr Ala Gly  Lys Asp Leu Leu Val  Cys Asp Ser
    1670                 1675                 1680

Met Gly  Arg Thr Arg Val Val  Cys His Ser Asn Asn  Lys Met Thr
    1685                 1690                 1695

Asp Glu  Thr Glu Tyr Gly Ile  Lys Thr Asp Ser Gly  Cys Pro Glu
    1700                 1705                 1710

Gly Ala  Arg Cys Tyr Val Leu  Asn Pro Glu Ala Val  Asn Ile Ser
    1715                 1720                 1725

Gly Thr  Lys Gly Ala Met Val  His Leu Gln Lys Thr  Gly Gly Glu
    1730                 1735                 1740

Phe Thr  Cys Val Thr Ala Ser  Gly Thr Pro Ala Phe  Phe Asp Leu
    1745                 1750                 1755

Lys Asn  Leu Lys Gly Trp Ser  Gly Leu Pro Ile Phe  Glu Ala Ser
    1760                 1765                 1770

Ser Gly  Arg Val Val Gly Arg  Val Lys Val Gly Lys  Asn Glu Asp
    1775                 1780                 1785

Ser Lys  Pro Thr Lys Leu Met  Ser Gly Ile Gln Thr  Val Ser Lys
    1790                 1795                 1800

Asn Gln  Thr Asp Leu Ala Asp  Ile Val Lys Lys Leu  Thr Ser Met
    1805                 1810                 1815

Asn Arg  Gly Glu Phe Lys Gln  Ile Thr Leu Ala Thr  Gly Ala Gly
    1820                 1825                 1830

Lys Thr  Thr Glu Leu Pro Arg  Ser Val Ile Glu Glu  Ile Gly Arg
    1835                 1840                 1845
```

```
His Lys  Arg Val Leu Val Leu  Ile Pro Leu Arg Ala  Ala Ala Glu
    1850                 1855                 1860

Ser Val  Tyr Gln Tyr Met Arg  Val Lys Tyr Pro Ser  Ile Ser Phe
    1865                 1870                 1875

Asn Leu  Arg Ile Gly Asp Met  Lys Glu Gly Asp Met  Ala Thr Gly
    1880                 1885                 1890

Ile Thr  Tyr Ala Ser Tyr Gly  Tyr Phe Cys Gln Leu  Pro Gln Pro
    1895                 1900                 1905

Lys Leu  Arg Ala Ala Met Val  Glu Tyr Ser Tyr Ile  Phe Leu Asp
    1910                 1915                 1920

Glu Tyr  His Cys Ala Thr Pro  Glu Gln Leu Ala Ile  Ile Gly Lys
    1925                 1930                 1935

Ile His  Arg Phe Ala Glu Asn  Leu Arg Val Val Ala  Met Thr Ala
    1940                 1945                 1950

Thr Pro  Ala Gly Thr Val Thr  Thr Thr Gly Gln Lys  His Pro Ile
    1955                 1960                 1965

Glu Glu  Phe Ile Ala Pro Glu  Val Met Lys Gly Glu  Asp Leu Gly
    1970                 1975                 1980

Ser Glu  Tyr Leu Asp Ile Ala  Gly Leu Lys Ile Pro  Thr Glu Glu
    1985                 1990                 1995

Met Lys  Gly Asn Met Leu Val  Phe Ala Pro Thr Arg  Asn Met Ala
    2000                 2005                 2010

Val Glu  Thr Ala Lys Lys Leu  Lys Ala Lys Gly Tyr  Asn Ser Gly
    2015                 2020                 2025

Tyr Tyr  Tyr Ser Gly Glu Asn  Pro Glu Asn Leu Arg  Val Val Thr
    2030                 2035                 2040

Ser Gln  Ser Pro Tyr Val Val  Val Ala Thr Asn Ala  Ile Glu Ser
    2045                 2050                 2055
```

```
Gly Val  Thr Leu Pro Asp Leu  Asp Thr Val Val Asp  Thr Gly Leu
    2060                 2065                 2070

Lys Cys  Glu Lys Arg Val Arg  Ile Ser Ser Lys Met  Pro Phe Ile
    2075                 2080                 2085

Val Thr  Gly Leu Lys Arg Met  Ala Val Thr Ile Gly  Glu Gln Ala
    2090                 2095                 2100

Gln Arg  Arg Gly Arg Val Gly  Arg Val Lys Pro Gly  Arg Tyr Tyr
    2105                 2110                 2115

Arg Ser  Gln Glu Thr Ala Ser  Gly Ser Lys Asp Tyr  His Tyr Asp
    2120                 2125                 2130

Leu Leu  Gln Ala Gln Arg Tyr  Gly Ile Glu Asp Gly  Ile Asn Val
    2135                 2140                 2145

Thr Lys  Ser Phe Arg Glu Met  Asn Tyr Asp Trp Ser  Leu Tyr Glu
    2150                 2155                 2160

Glu Asp  Ser Leu Met Ile Thr  Gln Leu Glu Val Leu  Asn Asn Leu
    2165                 2170                 2175

Leu Ile  Ser Glu Asp Leu Pro  Ala Ala Val Lys Asn  Ile Met Ala
    2180                 2185                 2190

Arg Thr  Asp His Pro Glu Pro  Ile Gln Leu Ala Tyr  Asn Ser Tyr
    2195                 2200                 2205

Glu Asn  Gln Ile Pro Val Leu  Phe Pro Lys Ile Lys  Asn Gly Glu
    2210                 2215                 2220

Val Thr  Asp Ser Tyr Glu Asn  Tyr Thr Tyr Leu Asn  Ala Arg Lys
    2225                 2230                 2235

Leu Gly  Glu Asp Val Pro Ala  Tyr Val Tyr Ala Thr  Glu Asp Glu
    2240                 2245                 2250

Asp Leu  Ala Val Asp Leu Leu  Gly Met Asp Trp Pro  Asp Pro Gly
    2255                 2260                 2265

Asn Gln  Gln Val Val Glu Thr  Gly Arg Ala Leu Lys  Gln Val Thr
    2270                 2275                 2280
```

```
Gly Leu  Ser Thr Ala Glu Asn  Ala Leu Leu Ile Ala  Leu Phe Gly
    2285                 2290                 2295

Tyr Val  Gly Tyr Gln Thr Leu  Ser Lys Arg His Ile  Pro Met Ile
    2300                 2305                 2310

Thr Asp  Ile Tyr Thr Leu Glu  Asp His Arg Leu Glu  Asp Thr Thr
    2315                 2320                 2325

His Leu  Gln Phe Ala Pro Asn  Ala Ile Arg Thr Asp  Gly Lys Asp
    2330                 2335                 2340

Ser Glu  Leu Lys Glu Leu Ala  Val Gly Asp Leu Asp  Lys Tyr Val
    2345                 2350                 2355

Asp Ala  Leu Val Asp Tyr Ser  Lys Gln Gly Met Lys  Phe Ile Lys
    2360                 2365                 2370

Val Gln  Ala Glu Lys Val Arg  Asp Ser Gln Ser Thr  Lys Glu Gly
    2375                 2380                 2385

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

Thr Glu  Asn Lys Glu Glu Ile  Ile Arg Tyr Gly Leu  Trp Gly Val
    2405                 2410                 2415

His Thr  Ala Leu Tyr Lys Ser  Leu Ala Ala Arg Leu  Gly His Glu
    2420                 2425                 2430

Thr Ala  Phe Ala Thr Leu Val  Val Lys Trp Leu Ala  Phe Gly Gly
    2435                 2440                 2445

Glu Thr  Val Ser Ala His Ile  Lys Gln Val Ala Val  Asp Leu Val
    2450                 2455                 2460

Val Tyr  Tyr Ile Ile Asn Lys  Pro Ser Phe Pro Gly  Asp Thr Glu
    2465                 2470                 2475

Thr Gln  Gln Glu Gly Arg Arg  Phe Val Ala Ser Leu  Phe Ile Ser
    2480                 2485                 2490
```

```
Ala Leu  Ala Thr Tyr Thr Tyr  Lys Thr Trp Asn Tyr  Asn Asn Leu
    2495                 2500                 2505

Gln Arg  Val Val Glu Pro Ala  Leu Ala Tyr Leu Pro  Tyr Ala Thr
    2510                 2515                 2520

Ser Ala  Leu Lys Leu Phe Thr  Pro Thr Arg Leu Glu  Ser Val Val
    2525                 2530                 2535

Ile Leu  Ser Ser Thr Ile Tyr  Lys Thr Tyr Leu Ser  Ile Arg Lys
    2540                 2545                 2550

Gly Lys  Ser Asp Gly Leu Leu  Gly Thr Gly Ile Ser  Ala Ala Met
    2555                 2560                 2565

Glu Ile  Leu Asn Gln Asn Pro  Ile Ser Val Gly Ile  Ser Val Met
    2570                 2575                 2580

Leu Gly  Val Gly Ala Ile Ala  Ala His Asn Ala Ile  Glu Ser Ser
    2585                 2590                 2595

Glu Gln  Lys Arg Thr Leu Leu  Met Lys Val Phe Val  Lys Asn Phe
    2600                 2605                 2610

Leu Asp  Gln Ala Ala Thr Asp  Glu Leu Val Lys Glu  Asn Pro Glu
    2615                 2620                 2625

Lys Ile  Ile Met Ala Leu Phe  Glu Ala Val Gln Thr  Ile Gly Asn
    2630                 2635                 2640

Pro Leu  Arg Leu Ile Tyr His  Leu Tyr Gly Val Tyr  Tyr Lys Gly
    2645                 2650                 2655

Trp Glu  Ala Lys Glu Leu Ala  Glu Lys Thr Ala Gly  Arg Asn Leu
    2660                 2665                 2670

Phe Thr  Leu Ile Met Phe Glu  Ala Phe Glu Leu Leu  Gly Met Asp
    2675                 2680                 2685

Ser Glu  Gly Lys Ile Arg Asn  Leu Ser Gly Asn Tyr  Ile Leu Asp
    2690                 2695                 2700

Leu Ile  Phe Asn Leu His Asn  Lys Leu Asn Lys Gly  Leu Lys Lys
    2705                 2710                 2715
```

```
Leu Val  Leu Gly Trp Ala Pro  Ala Pro Leu Ser Cys  Asp Trp Thr
    2720                 2725                 2730

Pro Ser  Asp Glu Arg Ile Ser  Leu Pro His Asn Asn  Tyr Leu Arg
    2735                 2740                 2745

Val Glu  Thr Arg Cys Pro Cys  Gly Tyr Glu Met Lys  Ala Ile Lys
    2750                 2755                 2760

Asn Val  Ala Gly Lys Leu Thr  Lys Val Glu Glu Lys  Gly Ser Phe
    2765                 2770                 2775

Leu Cys  Arg Asn Arg Leu Gly  Arg Gly Pro Pro Asn  Phe Lys Val
    2780                 2785                 2790

Thr Lys  Phe Tyr Asp Asp Asn  Leu Ile Glu Val Lys  Pro Val Ala
    2795                 2800                 2805

Arg Leu  Glu Gly Gln Val Asp  Leu Tyr Tyr Lys Gly  Val Thr Ala
    2810                 2815                 2820

Lys Leu  Asp Tyr Asn Asn Gly  Lys Val Leu Leu Ala  Thr Asn Lys
    2825                 2830                 2835

Trp Glu  Val Asp His Ala Phe  Leu Thr Arg Leu Val  Lys Lys His
    2840                 2845                 2850

Thr Gly  Ile Gly Phe Lys Gly  Ala Tyr Leu Gly Asp  Arg Pro Asp
    2855                 2860                 2865

His Gln  Asp Leu Val Asp Arg  Asp Cys Ala Thr Ile  Thr Lys Asn
    2870                 2875                 2880

Ser Val  Gln Phe Leu Lys Met  Lys Lys Gly Cys Ala  Phe Thr Tyr
    2885                 2890                 2895

Asp Leu  Thr Ile Ser Asn Leu  Val Arg Leu Ile Glu  Leu Val His
    2900                 2905                 2910

Lys Asn  Asn Leu Gln Glu Arg  Glu Ile Pro Thr Val  Thr Val Thr
    2915                 2920                 2925
```

```
Thr Trp  Leu Ala Tyr Ser Phe  Val Asn Glu Asp Leu  Gly Thr Ile
    2930                 2935                 2940

Lys Pro  Val Leu Gly Glu Lys  Val Ile Pro Glu Pro  Pro Glu Glu
    2945                 2950                 2955

Leu Ser  Leu Gln Pro Thr Val  Arg Leu Val Thr Thr  Glu Thr Ala
    2960                 2965                 2970

Ile Thr  Ile Thr Gly Glu Ala  Glu Val Met Thr Thr  Gly Ile Thr
    2975                 2980                 2985

Pro Val  Val Glu Met Lys Glu  Glu Pro Gln Leu Asp  His Gln Ser
    2990                 2995                 3000

Thr Thr  Leu Lys Val Gly Leu  Lys Glu Gly Glu Tyr  Pro Gly Pro
    3005                 3010                 3015

Gly Val  Asn Pro Asn His Leu  Ala Glu Val Ile Asp  Glu Lys Asp
    3020                 3025                 3030

Asp Arg  Pro Phe Val Leu Ile  Ile Gly Asn Lys Gly  Ser Thr Ser
    3035                 3040                 3045

Asn Arg  Ala Arg Thr Ala Lys  Asn Ile Arg Leu Tyr  Lys Gly Asn
    3050                 3055                 3060

Asn Pro  Arg Glu Ile Arg Asp  Leu Met Ser Gln Gly  Arg Ile Leu
    3065                 3070                 3075

Thr Val  Ala Leu Lys Glu Leu  Asp Pro Glu Leu Lys  Glu Leu Val
    3080                 3085                 3090

Asp Tyr  Lys Gly Thr Phe Leu  Asn Arg Glu Ala Leu  Glu Ala Leu
    3095                 3100                 3105

Ser Leu  Gly Lys Pro Ile Lys  Arg Lys Thr Thr Thr  Ala Met Ile
    3110                 3115                 3120

Arg Arg  Leu Ile Glu Pro Glu  Val Glu Glu Glu Leu  Pro Asp Trp
    3125                 3130                 3135

Phe Gln  Ala Glu Glu Pro Leu  Phe Leu Glu Ala Lys  Ile Gln Asn
    3140                 3145                 3150
```

```
Asp Leu  Tyr His Leu Ile Gly  Ser Val Asp Ser Ile  Lys Ser Lys
    3155                 3160                 3165

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

Val Gly  Ala Arg Thr Tyr Thr  Met Lys Leu Ser Ser  Trp Ser Thr
    3185                 3190                 3195

Gln Val  Thr Lys Lys Gln Met  Ser Leu Ala Pro Leu  Phe Glu Glu
    3200                 3205                 3210

Leu Leu  Leu Lys Cys Pro Pro  Cys Ser Lys Ile Ser  Lys Gly His
    3215                 3220                 3225

Met Val  Ser Ala Tyr Gln Leu  Ala Gln Gly Asn Trp  Glu Pro Leu
    3230                 3235                 3240

Gly Cys  Gly Val Tyr Met Gly  Thr Ile Pro Ala Arg  Arg Leu Lys
    3245                 3250                 3255

Ile His  Pro Tyr Glu Ala Tyr  Leu Lys Leu Lys Glu  Leu Val Glu
    3260                 3265                 3270

Val Glu  Ser Ser Arg Ala Thr  Ala Lys Glu Ser Ile  Ile Arg Glu
    3275                 3280                 3285

His Asn  Thr Trp Ile Leu Arg  Lys Val Arg His Glu  Gly Asn Leu
    3290                 3295                 3300

Arg Thr  Lys Ser Met Ile Asn  Pro Gly Lys Ile Ser  Asp Gln Leu
    3305                 3310                 3315

Cys Arg  Asp Gly His Lys Arg  Asn Ile Tyr Asn Lys  Ile Ile Gly
    3320                 3325                 3330

Ser Thr  Met Ala Ser Ala Gly  Ile Arg Leu Glu Lys  Leu Pro Val
    3335                 3340                 3345

Val Arg  Ala Gln Thr Asp Thr  Thr Ser Phe His Gln  Ala Ile Arg
    3350                 3355                 3360
```

Glu Lys Ile Asp Lys Thr Glu Asn Lys Gln Thr Pro Glu Leu His
3365 3370 3375

Glu Glu Leu Met Lys Val Phe Asp Cys Leu Lys Ile Pro Glu Leu
3380 3385 3390

Lys Glu Ser Tyr Asp Glu Val Ser Trp Glu Gln Leu Glu Ala Gly
3395 3400 3405

Ile Asn Arg Lys Gly Ala Ala Gly Tyr Leu Glu Ser Lys Asn Ile
3410 3415 3420

Gly Glu Val Leu Asp Thr Glu Lys His Ile Val Glu Gln Leu Ile
3425 3430 3435

Lys Asp Leu Arg Lys Gly Lys Lys Ile Arg Tyr Tyr Glu Thr Ala
3440 3445 3450

Ile Pro Lys Asn Glu Lys Arg Asp Val Ser Asp Asp Trp Glu Ala
3455 3460 3465

Gly Glu Phe Val Asp Glu Lys Lys Pro Arg Val Ile Gln Tyr Pro
3470 3475 3480

Asp Ala Lys Val Arg Leu Ala Ile Thr Lys Val Met Tyr Lys Trp
3485 3490 3495

Val Lys Gln Lys Pro Val Val Ile Pro Gly Tyr Glu Gly Lys Thr
3500 3505 3510

Pro Leu Phe Asp Ile Phe Asn Lys Val Lys Lys Glu Trp Asp Ser
3515 3520 3525

Phe Gln Asp Pro Val Ala Val Ser Phe Asp Thr Lys Ala Trp Asp
3530 3535 3540

Thr Gln Val Thr Ser Arg Asp Leu Met Leu Ile Lys Asp Ile Gln
3545 3550 3555

Lys Tyr Tyr Phe Lys Arg Ser Ile His Lys Phe Leu Asp Thr Ile
3560 3565 3570

Thr Glu His Met Val Glu Val Pro Val Ile Thr Ala Asp Gly Glu
3575 3580 3585

```
Val Tyr  Ile Arg Asn Gly Gln  Arg Gly Ser Gly Gln  Pro Asp Thr
    3590                 3595                 3600

Ser Ala  Gly Asn Ser Met Leu  Asn Val Leu Thr Met  Ile Tyr Ala
    3605                 3610                 3615

Phe Cys  Lys Ser Thr Gly Ile  Pro Tyr Arg Gly Phe  Ser Arg Val
    3620                 3625                 3630

Ala Arg  Ile His Val Cys Gly  Asp Asp Gly Phe Leu  Ile Thr Glu
    3635                 3640                 3645

Arg Gly  Leu Gly Leu Lys Phe  Ser Glu Lys Gly Met  Gln Ile Leu
    3650                 3655                 3660

His Glu  Ala Gly Lys Pro Gln  Lys Ile Thr Glu Gly  Asp Lys Met
    3665                 3670                 3675

Lys Val  Ala Tyr Arg Phe Glu  Asp Ile Glu Phe Cys  Ser His Thr
    3680                 3685                 3690

Pro Val  Pro Val Arg Trp Ala  Asp Asn Thr Ser Ser  Tyr Met Ala
    3695                 3700                 3705

Gly Arg  Ser Thr Ala Thr Ile  Leu Ala Lys Met Ala  Thr Arg Leu
    3710                 3715                 3720

Asp Ser  Ser Gly Glu Arg Gly  Ser Thr Ala Tyr Glu  Lys Ala Val
    3725                 3730                 3735

Ala Phe  Ser Phe Leu Leu Met  Tyr Ser Trp Asn Pro  Val Val Arg
    3740                 3745                 3750

Arg Ile  Cys Leu Leu Val Leu  Ser Gln Phe Pro Glu  Ile Ser Pro
    3755                 3760                 3765

Ser Lys  Asn Thr Ile Tyr Tyr  Tyr Gln Gly Asp Pro  Ile Ala Ala
    3770                 3775                 3780

Tyr Arg  Glu Val Ile Gly Lys  Gln Leu Cys Glu Leu  Lys Arg Thr
    3785                 3790                 3795
```

```
Gly Phe  Glu Lys Leu Ala Gly  Leu Asn Leu Ser Met  Thr Thr Leu
    3800                 3805                 3810

Gly Ile  Trp Thr Lys His Thr  Ser Lys Arg Leu Ile  Gln Asp Cys
    3815                 3820                 3825

Val Glu  Ile Gly Lys Arg Glu  Gly Asn Trp Leu Val  Asn Ala Asp
    3830                 3835                 3840

Arg Leu  Ile Ala Gly Lys Thr  Gly Lys Phe Tyr Ile  Pro Ser Thr
    3845                 3850                 3855

Gly Val  Thr Leu Leu Gly Lys  His Tyr Glu Glu Ile  Asn Leu Lys
    3860                 3865                 3870

Gln Lys  Ala Ala Gln Pro Pro  Ile Glu Gly Val Asp  Arg Tyr Lys
    3875                 3880                 3885

Leu Gly  Pro Ile Val Asn Val  Ile Leu Arg Arg Leu  Arg Val Met
    3890                 3895                 3900

Leu Met  Thr Val Ala Ser Gly  Ser Trp
    3905                 3910
```

<210> 9
<211> 3913
<212> PRT
<213> BVDV

<400> 9

```
Met Glu Leu Phe Ser Asn Glu Leu Leu Tyr Lys Thr Tyr Lys Gln Lys
1               5                  10                  15

Pro Ala Gly Val Val Glu Pro Val Tyr Asp Val Asn Gly Arg Pro Leu
            20                  25                  30

Phe Gly Glu Ser Ser Asp Leu His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Gln Arg Gly Ser Ala Asn Ile Leu Thr Asn Ala Arg Ser Leu Pro
    50                  55                  60

Arg Lys Gly Asp Cys Arg Arg Gly Asn Val Tyr Gly Pro Val Ser Gly
65                  70                  75                  80
```

```
Ile Tyr Ile Lys Pro Gly Pro Ile Tyr Tyr Gln Asp Tyr Val Gly Pro
                85                  90                  95

Val Tyr His Arg Ala Pro Leu Glu Leu Cys Arg Glu Ala Ser Met Cys
            100                 105                 110

Glu Thr Thr Arg Arg Val Gly Arg Val Thr Gly Ser Asp Gly Lys Leu
        115                 120                 125

Tyr His Ile Tyr Ile Cys Ile Asp Gly Cys Ile Leu Leu Lys Arg Ala
    130                 135                 140

Thr Arg Asn Gln Pro Glu Val Leu Lys Trp Val Tyr Asn Arg Leu Asn
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Glu Gly Ser Lys Gly Ala
                165                 170                 175

Thr Ser Lys Lys Gln Pro Lys Pro Asp Arg Ile Glu Lys Gly Lys Met
            180                 185                 190

Lys Ile Ala Pro Lys Glu Thr Glu Lys Asp Cys Lys Thr Arg Pro Pro
        195                 200                 205

Asp Ala Thr Ile Val Val Glu Gly Val Lys Tyr Gln Val Lys Lys Lys
    210                 215                 220

Gly Lys Val Arg Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys
225                 230                 235                 240

Asn Lys Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala
                245                 250                 255

Trp Ala Ile Leu Ala Ala Val Leu Leu Gln Leu Val Thr Gly Glu Asn
            260                 265                 270

Ile Thr Gln Trp Asn Leu Met Asp Asn Gly Thr Glu Gly Ile Gln Gln
        275                 280                 285

Ala Met Phe Leu Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro
    290                 295                 300

Glu Lys Ile Cys Thr Gly Val Pro Thr His Leu Ala Thr Asp Tyr Glu
```

```
305                 310                 315                 320

Leu Lys Glu Ile Val Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr
                325                 330                 335

Thr Cys Cys Arg Leu Gln Arg His Glu Trp Asn Lys His Gly Trp Cys
            340                 345                 350

Asn Trp Phe His Ile Glu Pro Trp Ile Trp Leu Met Asn Lys Thr Gln
        355                 360                 365

Asn Asn Leu Thr Glu Gly Gln Pro Leu Arg Glu Cys Ala Val Thr Cys
    370                 375                 380

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

Arg Pro Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Asn Phe Ser Phe
                405                 410                 415

Ala Gly Val Ile Leu Asp Gly Pro Cys Asn Phe Lys Val Ser Val Glu
            420                 425                 430

Asp Val Leu Phe Lys Glu His Asp Ser Gly Asn Met Leu Gln Glu Thr
        435                 440                 445

Ala Ile Gln Leu Leu Asp Gly Ala Thr Asn Thr Ile Glu Gly Ala Arg
    450                 455                 460

Val Gly Thr Ala Lys Leu Thr Thr Trp Leu Gly Lys Gln Leu Gly Ile
465                 470                 475                 480

Leu Gly Lys Lys Leu Glu Asn Lys Ser Lys Ala Trp Phe Gly Ala His
                485                 490                 495

Ala Ala Ser Pro Tyr Cys Gly Val Glu Arg Lys Ile Gly Tyr Val Trp
            500                 505                 510

Tyr Thr Lys Asn Cys Thr Pro Ala Cys Leu Pro Arg Asn Thr Arg Ile
        515                 520                 525

Ile Gly Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu
    530                 535                 540
```

```
His Glu Met Gly Gly His Leu Ser Glu Phe Val Leu Leu Ser Leu Val
545                 550                 555                 560

Val Leu Ser Asp Phe Ala Pro Glu Thr Ala Ser Val Ile Tyr Leu Val
                565                 570                 575

Leu His Phe Ala Ile Pro Gln Ser His Val Asp Val Asp Thr Cys Asp
            580                 585                 590

Lys Asn Gln Leu Asn Leu Thr Val Ala Thr Thr Val Ala Glu Val Ile
        595                 600                 605

Pro Gly Thr Val Trp Asn Leu Gly Lys Tyr Val Cys Ile Arg Pro Asp
    610                 615                 620

Trp Trp Pro Tyr Glu Thr Thr Thr Val Phe Val Ile Glu Glu Ala Gly
625                 630                 635                 640

Gln Val Ile Lys Leu Met Leu Arg Ala Ile Arg Asp Leu Thr Arg Ile
                645                 650                 655

Trp Asn Ala Ala Thr Thr Thr Ala Phe Leu Ile Phe Leu Val Lys Ala
            660                 665                 670

Leu Arg Gly Gln Leu Ile Gln Gly Leu Leu Trp Leu Met Leu Ile Thr
        675                 680                 685

Gly Ala Gln Gly Phe Pro Glu Cys Lys Glu Gly Phe Gln Tyr Ala Ile
    690                 695                 700

Ser Lys Asp Arg Lys Met Gly Leu Leu Gly Pro Glu Ser Leu Thr Thr
705                 710                 715                 720

Thr Trp His Leu Pro Thr Lys Lys Ile Val Asp Ser Met Val His Val
                725                 730                 735

Trp Cys Glu Gly Lys Asp Leu Lys Ile Leu Lys Met Cys Thr Lys Glu
            740                 745                 750

Glu Arg Tyr Leu Val Ala Val His Glu Arg Ala Leu Ser Thr Ser Ala
        755                 760                 765

Glu Phe Met Gln Ile Ser Asp Gly Thr Ile Gly Pro Asp Val Ile Asp
```

770 775 780

Met Pro Asp Asp Phe Glu Phe Gly Leu Cys Pro Cys Asp Ser Lys Pro
785 790 795 800

Val Ile Lys Gly Lys Phe Asn Ala Ser Leu Leu Asn Gly Pro Ala Phe
805 810 815

Gln Met Val Cys Pro Gln Gly Trp Thr Gly Thr Ile Glu Cys Thr Leu
820 825 830

Ala Asn Gln Asp Thr Leu Asp Thr Thr Val Ile Arg Thr Tyr Arg Arg
835 840 845

Thr Thr Pro Phe Gln Arg Arg Lys Trp Cys Thr Tyr Glu Lys Ile Ile
850 855 860

Gly Glu Asp Ile Tyr Glu Cys Ile Leu Gly Gly Asn Trp Thr Cys Ile
865 870 875 880

Thr Gly Asp His Ser Arg Leu Lys Asp Gly Pro Ile Lys Lys Cys Lys
885 890 895

Trp Cys Gly His Asp Phe Val Asn Ser Glu Gly Leu Pro His Tyr Pro
900 905 910

Ile Gly Lys Cys Met Leu Ile Asn Glu Ser Gly Tyr Arg Tyr Val Asp
915 920 925

Asp Thr Ser Cys Asp Arg Gly Gly Val Ala Ile Val Pro Ser Gly Thr
930 935 940

Val Lys Cys Arg Ile Gly Asn Val Thr Val Gln Val Ile Ala Thr Asn
945 950 955 960

Asn Asp Leu Gly Pro Met Pro Cys Ser Pro Ala Glu Val Ile Ala Ser
965 970 975

Glu Gly Pro Val Glu Lys Thr Ala Cys Thr Phe Asn Tyr Ser Arg Thr
980 985 990

Leu Pro Asn Lys Tyr Tyr Glu Pro Arg Asp Arg Tyr Phe Gln Gln Tyr
995 1000 1005

```
Met Leu  Lys Gly Glu Trp Gln  Tyr Trp Phe Asp Leu  Asp Ser Val
    1010                 1015                 1020

Asp His  His Lys Asp Tyr Phe  Ser Glu Phe Ile Ile  Ile Ala Val
    1025                 1030                 1035

Val Ala  Leu Leu Gly Gly Lys  Tyr Val Leu Trp Leu  Leu Ile Thr
    1040                 1045                 1050

Tyr Thr  Ile Leu Ser Glu Gln  Met Ala Met Gly Ala  Gly Val Asn
    1055                 1060                 1065

Thr Glu  Glu Ile Val Met Ile  Gly Asn Leu Leu Thr  Asp Ser Asp
    1070                 1075                 1080

Ile Glu  Val Val Val Tyr Phe  Leu Leu Leu Tyr Leu  Ile Val Lys
    1085                 1090                 1095

Glu Glu  Leu Ala Arg Lys Trp  Ile Ile Leu Val Tyr  His Ile Leu
    1100                 1105                 1110

Val Ala  Asn Pro Met Lys Thr  Ile Gly Val Val Leu  Leu Met Leu
    1115                 1120                 1125

Gly Gly  Val Val Lys Ala Ser  Arg Ile Asn Ala Asp  Asp Gln Ser
    1130                 1135                 1140

Ala Met  Asp Pro Cys Phe Leu  Leu Val Thr Gly Val  Val Ala Val
    1145                 1150                 1155

Leu Met  Ile Ala Arg Arg Glu  Pro Ala Thr Leu Pro  Leu Ile Val
    1160                 1165                 1170

Ala Leu  Leu Ala Ile Arg Thr  Ser Gly Phe Leu Leu  Pro Ala Ser
    1175                 1180                 1185

Ile Asp  Val Thr Val Ala Val  Val Leu Ile Val Leu  Leu Leu Ala
    1190                 1195                 1200

Ser Tyr  Ile Thr Asp Tyr Phe  Arg Tyr Lys Lys Trp  Leu Gln Leu
    1205                 1210                 1215

Leu Phe  Ser Leu Ile Ala Gly  Ile Phe Ile Ile Arg  Ser Leu Lys
```

1220 1225 1230

His Ile Asn Gln Met Glu Val Pro Glu Ile Ser Met Pro Ser Trp
1235 1240 1245

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

Thr Thr Asn Trp Asp Ile Asp Leu Ala Gly Phe Leu Leu Gln Trp
1265 1270 1275

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

Thr Leu Ile Ile Val Leu Pro Ser Tyr Glu Leu Ser Lys Leu Tyr
1295 1300 1305

Phe Leu Lys Asn Val Arg Thr Asp Val Glu Lys Asn Trp Leu Gly
1310 1315 1320

Lys Val Lys Tyr Arg Gln Ile Ser Ser Val Tyr Asp Ile Cys Asp
1325 1330 1335

Ser Glu Glu Ala Val Tyr Leu Phe Pro Ser Arg His Lys Ser Gly
1340 1345 1350

Ser Arg Pro Asp Phe Ile Leu Pro Phe Leu Lys Ala Val Leu Ile
1355 1360 1365

Ser Cys Ile Ser Ser Gln Trp Gln Val Val Tyr Ile Ser Tyr Leu
1370 1375 1380

Ile Leu Glu Ile Thr Tyr Tyr Met His Arg Lys Ile Ile Asp Glu
1385 1390 1395

Val Ser Gly Gly Ala Asn Phe Leu Ser Arg Leu Ile Ala Ala Ile
1400 1405 1410

Ile Glu Leu Asn Trp Ala Ile Asp Asp Glu Glu Cys Lys Gly Leu
1415 1420 1425

Lys Lys Leu Tyr Leu Leu Ser Gly Arg Val Lys Asn Leu Ile Val
1430 1435 1440

```
Lys His  Lys Val Arg Asn Glu  Ala Val His Arg Trp  Phe Gly Glu
    1445                1450                1455

Glu Glu  Ile Tyr Gly Ala Pro  Lys Val Ile Thr Ile  Ile Lys Ala
    1460                1465                1470

Ser Thr  Leu Ser Lys Asn Arg  His Cys Ile Ile Cys  Thr Ile Cys
    1475                1480                1485

Glu Gly  Lys Glu Trp Asn Gly  Ala Asn Cys Pro Lys  Cys Gly Arg
    1490                1495                1500

Gln Gly  Lys Pro Ile Thr Cys  Gly Met Thr Leu Ala  Asp Phe Glu
    1505                1510                1515

Glu Lys  His Tyr Lys Lys Ile  Phe Ile Arg Glu Glu  Ser Ser Cys
    1520                1525                1530

Pro Val  Pro Phe Asp Pro Ser  Cys His Cys Asn Tyr  Phe Arg His
    1535                1540                1545

Asp Gly  Pro Phe Arg Lys Glu  Tyr Lys Gly Tyr Val  Gln Tyr Thr
    1550                1555                1560

Ala Arg  Gly Gln Leu Phe Leu  Arg Asn Leu Pro Ile  Leu Ala Thr
    1565                1570                1575

Lys Met  Lys Leu Leu Met Val  Gly Asn Leu Gly Ala  Glu Ile Gly
    1580                1585                1590

Asp Leu  Glu His Leu Gly Trp  Val Leu Arg Gly Pro  Ala Val Cys
    1595                1600                1605

Lys Lys  Ile Thr Asn His Glu  Lys Cys His Val Asn  Ile Met Asp
    1610                1615                1620

Lys Leu  Thr Ala Phe Phe Gly  Ile Met Pro Arg Gly  Thr Thr Pro
    1625                1630                1635

Arg Ala  Pro Val Arg Phe Pro  Thr Ala Leu Leu Lys  Val Arg Arg
    1640                1645                1650

Gly Leu  Glu Thr Gly Trp Ala  Tyr Thr His Gln Gly  Gly Ile Ser
```

1655 1660 1665

Ser Val Asp His Val Thr Ala Gly Lys Asp Leu Leu Val Cys Asp
1670 1675 1680

Ser Met Gly Arg Thr Arg Val Val Cys His Ser Asn Asn Lys Met
1685 1690 1695

Thr Asp Glu Thr Glu Tyr Gly Ile Lys Thr Asp Ser Gly Cys Pro
1700 1705 1710

Glu Gly Ala Arg Cys Tyr Val Leu Asn Pro Glu Ala Val Asn Ile
1715 1720 1725

Ser Gly Thr Lys Gly Ala Met Val His Leu Gln Lys Thr Gly Gly
1730 1735 1740

Glu Phe Thr Cys Val Thr Ala Ser Gly Thr Pro Ala Phe Phe Asp
1745 1750 1755

Leu Lys Asn Leu Lys Gly Trp Ser Gly Leu Pro Ile Phe Glu Ala
1760 1765 1770

Ser Ser Gly Arg Val Val Gly Arg Val Lys Val Gly Lys Asn Glu
1775 1780 1785

Asp Ser Lys Pro Thr Lys Leu Met Ser Gly Ile Gln Thr Val Ser
1790 1795 1800

Lys Asn Gln Thr Asp Leu Ala Asp Ile Val Lys Lys Leu Thr Ser
1805 1810 1815

Met Asn Arg Gly Glu Phe Lys Gln Ile Thr Leu Ala Thr Gly Ala
1820 1825 1830

Gly Lys Thr Thr Glu Leu Pro Arg Ser Val Ile Glu Glu Ile Gly
1835 1840 1845

Arg His Lys Arg Val Leu Val Leu Ile Pro Leu Arg Ala Ala Ala
1850 1855 1860

Glu Ser Val Tyr Gln Tyr Met Arg Val Lys Tyr Pro Ser Ile Ser
1865 1870 1875

Phe Asn Leu Arg Ile Gly Asp Met Lys Glu Gly Asp Met Ala Thr
1880 1885 1890

Gly Ile Thr Tyr Ala Ser Tyr Gly Tyr Phe Cys Gln Leu Pro Gln
1895 1900 1905

Pro Lys Leu Arg Ala Ala Met Val Glu Tyr Ser Tyr Ile Phe Leu
1910 1915 1920

Asp Glu Tyr His Cys Ala Thr Pro Glu Gln Leu Ala Ile Ile Gly
1925 1930 1935

Lys Ile His Arg Phe Ala Glu Asn Leu Arg Val Val Ala Met Thr
1940 1945 1950

Ala Thr Pro Ala Gly Thr Val Thr Thr Thr Gly Gln Lys His Pro
1955 1960 1965

Ile Glu Glu Phe Ile Ala Pro Glu Val Met Lys Gly Glu Asp Leu
1970 1975 1980

Gly Ser Glu Tyr Leu Asp Ile Ala Gly Leu Lys Ile Pro Thr Glu
1985 1990 1995

Glu Met Lys Gly Asn Met Leu Val Phe Ala Pro Thr Arg Asn Met
2000 2005 2010

Ala Val Glu Thr Ala Lys Lys Leu Lys Ala Lys Gly Tyr Asn Ser
2015 2020 2025

Gly Tyr Tyr Tyr Ser Gly Glu Asn Pro Glu Asn Leu Arg Val Val
2030 2035 2040

Thr Ser Gln Ser Pro Tyr Val Val Val Ala Thr Asn Ala Ile Glu
2045 2050 2055

Ser Gly Val Thr Leu Pro Asp Leu Asp Thr Val Val Asp Thr Gly
2060 2065 2070

Leu Lys Cys Glu Lys Arg Val Arg Ile Ser Ser Lys Met Pro Phe
2075 2080 2085

Ile Val Thr Gly Leu Lys Arg Met Ala Val Thr Ile Gly Glu Gln

2090 2095 2100

Ala Gln Arg Arg Gly Arg Val Gly Arg Val Lys Pro Gly Arg Tyr
2105 2110 2115

Tyr Arg Ser Gln Glu Thr Ala Ser Gly Ser Lys Asp Tyr His Tyr
2120 2125 2130

Asp Leu Leu Gln Ala Gln Arg Tyr Gly Ile Glu Asp Gly Ile Asn
2135 2140 2145

Val Thr Lys Ser Phe Arg Glu Met Asn Tyr Asp Trp Ser Leu Tyr
2150 2155 2160

Glu Glu Asp Ser Leu Met Ile Thr Gln Leu Glu Val Leu Asn Asn
2165 2170 2175

Leu Leu Ile Ser Glu Asp Leu Pro Ala Ala Val Lys Asn Ile Met
2180 2185 2190

Ala Arg Thr Asp His Pro Glu Pro Ile Gln Leu Ala Tyr Asn Ser
2195 2200 2205

Tyr Glu Asn Gln Ile Pro Val Leu Phe Pro Lys Ile Lys Asn Gly
2210 2215 2220

Glu Val Thr Asp Ser Tyr Glu Asn Tyr Thr Tyr Leu Asn Ala Arg
2225 2230 2235

Lys Leu Gly Glu Asp Val Pro Ala Tyr Val Tyr Ala Thr Glu Asp
2240 2245 2250

Glu Asp Leu Ala Val Asp Leu Leu Gly Met Asp Trp Pro Asp Pro
2255 2260 2265

Gly Asn Gln Gln Val Val Glu Thr Gly Arg Ala Leu Lys Gln Val
2270 2275 2280

Thr Gly Leu Ser Thr Ala Glu Asn Ala Leu Leu Ile Ala Leu Phe
2285 2290 2295

Gly Tyr Val Gly Tyr Gln Thr Leu Ser Lys Arg His Ile Pro Met
2300 2305 2310

```
Ile Thr  Asp Ile Tyr Thr Leu  Glu Asp His Arg Leu  Glu Asp Thr
    2315                 2320                 2325

Thr His  Leu Gln Phe Ala Pro  Asn Ala Ile Arg Thr  Asp Gly Lys
    2330                 2335                 2340

Asp Ser  Glu Leu Lys Glu Leu  Ala Val Gly Asp Leu  Asp Lys Tyr
    2345                 2350                 2355

Val Asp  Ala Leu Val Asp Tyr  Ser Lys Gln Gly Met  Lys Phe Ile
    2360                 2365                 2370

Lys Val  Gln Ala Glu Lys Val  Arg Asp Ser Gln Ser  Thr Lys Glu
    2375                 2380                 2385

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

Leu Thr  Glu Asn Lys Glu Glu  Ile Ile Arg Tyr Gly  Leu Trp Gly
    2405                 2410                 2415

Val His  Thr Ala Leu Tyr Lys  Ser Leu Ala Ala Arg  Leu Gly His
    2420                 2425                 2430

Glu Thr  Ala Phe Ala Thr Leu  Val Val Lys Trp Leu  Ala Phe Gly
    2435                 2440                 2445

Gly Glu  Thr Val Ser Ala His  Ile Lys Gln Val Ala  Val Asp Leu
    2450                 2455                 2460

Val Val  Tyr Tyr Ile Ile Asn  Lys Pro Ser Phe Pro  Gly Asp Thr
    2465                 2470                 2475

Glu Thr  Gln Gln Glu Gly Arg  Arg Phe Val Ala Ser  Leu Phe Ile
    2480                 2485                 2490

Ser Ala  Leu Ala Thr Tyr Thr  Tyr Lys Thr Trp Asn  Tyr Asn Asn
    2495                 2500                 2505

Leu Gln  Arg Val Val Glu Pro  Ala Leu Ala Tyr Leu  Pro Tyr Ala
    2510                 2515                 2520

Thr Ser  Ala Leu Lys Leu Phe  Thr Pro Thr Arg Leu  Glu Ser Val
```

2525 2530 2535

Val Ile Leu Ser Ser Thr Ile Tyr Lys Thr Tyr Leu Ser Ile Arg
2540 2545 2550

Lys Gly Lys Ser Asp Gly Leu Leu Gly Thr Gly Ile Ser Ala Ala
2555 2560 2565

Met Glu Ile Leu Asn Gln Asn Pro Ile Ser Val Gly Ile Ser Val
2570 2575 2580

Met Leu Gly Val Gly Ala Ile Ala Ala His Asn Ala Ile Glu Ser
2585 2590 2595

Ser Glu Gln Lys Arg Thr Leu Leu Met Lys Val Phe Val Lys Asn
2600 2605 2610

Phe Leu Asp Gln Ala Ala Thr Asp Glu Leu Val Lys Glu Asn Pro
2615 2620 2625

Glu Lys Ile Ile Met Ala Leu Phe Glu Ala Val Gln Thr Ile Gly
2630 2635 2640

Asn Pro Leu Arg Leu Ile Tyr His Leu Tyr Gly Val Tyr Tyr Lys
2645 2650 2655

Gly Trp Glu Ala Lys Glu Leu Ala Glu Lys Thr Ala Gly Arg Asn
2660 2665 2670

Leu Phe Thr Leu Ile Met Phe Glu Ala Phe Glu Leu Leu Gly Met
2675 2680 2685

Asp Ser Glu Gly Lys Ile Arg Asn Leu Ser Gly Asn Tyr Ile Leu
2690 2695 2700

Asp Leu Ile Phe Asn Leu His Asn Lys Leu Asn Lys Gly Leu Lys
2705 2710 2715

Lys Leu Val Leu Gly Trp Ala Pro Ala Pro Leu Ser Cys Asp Trp
2720 2725 2730

Thr Pro Ser Asp Glu Arg Ile Ser Leu Pro His Asn Asn Tyr Leu
2735 2740 2745

```
Arg Val  Glu Thr Arg Cys Pro  Cys Gly Tyr Glu Met  Lys Ala Ile
    2750                 2755                 2760

Lys Asn  Val Ala Gly Lys Leu  Thr Lys Val Glu Glu  Lys Gly Ser
    2765                 2770                 2775

Phe Leu  Cys Arg Asn Arg Leu  Gly Arg Gly Pro Pro  Asn Phe Lys
    2780                 2785                 2790

Val Thr  Lys Phe Tyr Asp Asp  Asn Leu Ile Glu Val  Lys Pro Val
    2795                 2800                 2805

Ala Arg  Leu Glu Gly Gln Val  Asp Leu Tyr Tyr Lys  Gly Val Thr
    2810                 2815                 2820

Ala Lys  Leu Asp Tyr Asn Asn  Gly Lys Val Leu Leu  Ala Thr Asn
    2825                 2830                 2835

Lys Trp  Glu Val Asp His Ala  Phe Leu Thr Arg Leu  Val Lys Lys
    2840                 2845                 2850

His Thr  Gly Ile Gly Phe Lys  Gly Ala Tyr Leu Gly  Asp Arg Pro
    2855                 2860                 2865

Asp His  Gln Asp Leu Val Asp  Arg Asp Cys Ala Thr  Ile Thr Lys
    2870                 2875                 2880

Asn Ser  Val Gln Phe Leu Lys  Met Lys Lys Gly Cys  Ala Phe Thr
    2885                 2890                 2895

Tyr Asp  Leu Thr Ile Ser Asn  Leu Val Arg Leu Ile  Glu Leu Val
    2900                 2905                 2910

His Lys  Asn Asn Leu Gln Glu  Arg Glu Ile Pro Thr  Val Thr Val
    2915                 2920                 2925

Thr Thr  Trp Leu Ala Tyr Ser  Phe Val Asn Glu Asp  Leu Gly Thr
    2930                 2935                 2940

Ile Lys  Pro Val Leu Gly Glu  Lys Val Ile Pro Glu  Pro Pro Glu
    2945                 2950                 2955

Glu Leu  Ser Leu Gln Pro Thr  Val Arg Leu Val Thr  Thr Glu Thr
```

2960 2965 2970

Ala Ile Thr Ile Thr Gly Glu Ala Glu Val Met Thr Thr Gly Ile
2975 2980 2985

Thr Pro Val Val Glu Met Lys Glu Glu Pro Gln Leu Asp His Gln
2990 2995 3000

Ser Thr Thr Leu Lys Val Gly Leu Lys Glu Gly Glu Tyr Pro Gly
3005 3010 3015

Pro Gly Val Asn Pro Asn His Leu Ala Glu Val Ile Asp Glu Lys
3020 3025 3030

Asp Asp Arg Pro Phe Val Leu Ile Ile Gly Asn Lys Gly Ser Thr
3035 3040 3045

Ser Asn Arg Ala Arg Thr Ala Lys Asn Ile Arg Leu Tyr Lys Gly
3050 3055 3060

Asn Asn Pro Arg Glu Ile Arg Asp Leu Met Ser Gln Gly Arg Ile
3065 3070 3075

Leu Thr Val Ala Leu Lys Glu Leu Asp Pro Glu Leu Lys Glu Leu
3080 3085 3090

Val Asp Tyr Lys Gly Thr Phe Leu Asn Arg Glu Ala Leu Glu Ala
3095 3100 3105

Leu Ser Leu Gly Lys Pro Ile Lys Arg Lys Thr Thr Thr Ala Met
3110 3115 3120

Ile Arg Arg Leu Ile Glu Pro Glu Val Glu Glu Glu Leu Pro Asp
3125 3130 3135

Trp Phe Gln Ala Glu Glu Pro Leu Phe Leu Glu Ala Lys Ile Gln
3140 3145 3150

Asn Asp Leu Tyr His Leu Ile Gly Ser Val Asp Ser Ile Lys Ser
3155 3160 3165

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

```
Glu Val  Gly Ala Arg Thr Tyr  Thr Met Lys Leu Ser  Ser Trp Ser
    3185                 3190                 3195

Thr Gln  Val Thr Lys Lys Gln  Met Ser Leu Ala Pro  Leu Phe Glu
    3200                 3205                 3210

Glu Leu  Leu Leu Lys Cys Pro  Pro Cys Ser Lys Ile  Ser Lys Gly
    3215                 3220                 3225

His Met  Val Ser Ala Tyr Gln  Leu Ala Gln Gly Asn  Trp Glu Pro
    3230                 3235                 3240

Leu Gly  Cys Gly Val Tyr Met  Gly Thr Ile Pro Ala  Arg Arg Leu
    3245                 3250                 3255

Lys Ile  His Pro Tyr Glu Ala  Tyr Leu Lys Leu Lys  Glu Leu Val
    3260                 3265                 3270

Glu Val  Glu Ser Ser Arg Ala  Thr Ala Lys Glu Ser  Ile Ile Arg
    3275                 3280                 3285

Glu His  Asn Thr Trp Ile Leu  Arg Lys Val Arg His  Glu Gly Asn
    3290                 3295                 3300

Leu Arg  Thr Lys Ser Met Ile  Asn Pro Gly Lys Ile  Ser Asp Gln
    3305                 3310                 3315

Leu Cys  Arg Asp Gly His Lys  Arg Asn Ile Tyr Asn  Lys Ile Ile
    3320                 3325                 3330

Gly Ser  Thr Met Ala Ser Ala  Gly Ile Arg Leu Glu  Lys Leu Pro
    3335                 3340                 3345

Val Val  Arg Ala Gln Thr Asp  Thr Thr Ser Phe His  Gln Ala Ile
    3350                 3355                 3360

Arg Glu  Lys Ile Asp Lys Thr  Glu Asn Lys Gln Thr  Pro Glu Leu
    3365                 3370                 3375

His Glu  Glu Leu Met Lys Val  Phe Asp Cys Leu Lys  Ile Pro Glu
    3380                 3385                 3390

Leu Lys  Glu Ser Tyr Asp Glu  Val Ser Trp Glu Gln  Leu Glu Ala
```

3395 3400 3405

Gly Ile Asn Arg Lys Gly Ala Ala Gly Tyr Leu Glu Ser Lys Asn
3410 3415 3420

Ile Gly Glu Val Leu Asp Thr Glu Lys His Ile Val Glu Gln Leu
3425 3430 3435

Ile Lys Asp Leu Arg Lys Gly Lys Lys Ile Arg Tyr Tyr Glu Thr
3440 3445 3450

Ala Ile Pro Lys Asn Glu Lys Arg Asp Val Ser Asp Asp Trp Glu
3455 3460 3465

Ala Gly Glu Phe Val Asp Glu Lys Lys Pro Arg Val Ile Gln Tyr
3470 3475 3480

Pro Asp Ala Lys Val Arg Leu Ala Ile Thr Lys Val Met Tyr Lys
3485 3490 3495

Trp Val Lys Gln Lys Pro Val Val Ile Pro Gly Tyr Glu Gly Lys
3500 3505 3510

Thr Pro Leu Phe Asp Ile Phe Asn Lys Val Lys Lys Glu Trp Asp
3515 3520 3525

Ser Phe Gln Asp Pro Val Ala Val Ser Phe Asp Thr Lys Ala Trp
3530 3535 3540

Asp Thr Gln Val Thr Ser Arg Asp Leu Met Leu Ile Lys Asp Ile
3545 3550 3555

Gln Lys Tyr Tyr Phe Lys Arg Ser Ile His Lys Phe Leu Asp Thr
3560 3565 3570

Ile Thr Glu His Met Val Glu Val Pro Val Ile Thr Ala Asp Gly
3575 3580 3585

Glu Val Tyr Ile Arg Asn Gly Gln Arg Gly Ser Gly Gln Pro Asp
3590 3595 3600

Thr Ser Ala Gly Asn Ser Met Leu Asn Val Leu Thr Met Ile Tyr
3605 3610 3615

```
Ala Phe  Cys Lys Ser Thr Gly  Ile Pro Tyr Arg Gly  Phe Ser Arg
    3620                 3625                 3630

Val Ala  Arg Ile His Val Cys  Gly Asp Asp Gly Phe  Leu Ile Thr
    3635                 3640                 3645

Glu Arg  Gly Leu Gly Leu Lys  Phe Ser Glu Lys Gly  Met Gln Ile
    3650                 3655                 3660

Leu His  Glu Ala Gly Lys Pro  Gln Lys Ile Thr Glu  Gly Asp Lys
    3665                 3670                 3675

Met Lys  Val Ala Tyr Arg Phe  Glu Asp Ile Glu Phe  Cys Ser His
    3680                 3685                 3690

Thr Pro  Val Pro Val Arg Trp  Ala Asp Asn Thr Ser  Ser Tyr Met
    3695                 3700                 3705

Ala Gly  Arg Ser Thr Ala Thr  Ile Leu Ala Lys Met  Ala Thr Arg
    3710                 3715                 3720

Leu Asp  Ser Ser Gly Glu Arg  Gly Ser Thr Ala Tyr  Glu Lys Ala
    3725                 3730                 3735

Val Ala  Phe Ser Phe Leu Leu  Met Tyr Ser Trp Asn  Pro Val Val
    3740                 3745                 3750

Arg Arg  Ile Cys Leu Leu Val  Leu Ser Gln Phe Pro  Glu Ile Ser
    3755                 3760                 3765

Pro Ser  Lys Asn Thr Ile Tyr  Tyr Tyr Gln Gly Asp  Pro Ile Ala
    3770                 3775                 3780

Ala Tyr  Arg Glu Val Ile Gly  Lys Gln Leu Cys Glu  Leu Lys Arg
    3785                 3790                 3795

Thr Gly  Phe Glu Lys Leu Ala  Gly Leu Asn Leu Ser  Met Thr Thr
    3800                 3805                 3810

Leu Gly  Ile Trp Thr Lys His  Thr Ser Lys Arg Leu  Ile Gln Asp
    3815                 3820                 3825

Cys Val  Glu Ile Gly Lys Arg  Glu Gly Asn Trp Leu  Val Asn Ala
```

```
    3830                3835                3840

Asp Arg  Leu Ile Ala Gly Lys  Thr Gly Lys Phe Tyr  Ile Pro Ser
    3845                3850                3855

Thr Gly  Val Thr Leu Leu Gly  Lys His Tyr Glu Glu  Ile Asn Leu
    3860                3865                3870

Lys Gln  Lys Ala Ala Gln Pro  Pro Ile Glu Gly Val  Asp Arg Tyr
    3875                3880                3885

Lys Leu  Gly Pro Ile Val Asn  Val Ile Leu Arg Arg  Leu Arg Val
    3890                3895                3900

Met Leu  Met Thr Val Ala Ser  Gly Ser Trp
    3905                3910
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<210> 10
<211> 3895
<212> PRT
<213> BDV

<400> 10

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Met Glu Leu Asn Lys Phe Glu Leu Leu Tyr Lys Thr Ser Lys Gln Lys
1               5                   10                  15

Pro Val Gly Val Thr Glu Pro Ile Tyr Asp Ser Ala Gly Asn Pro Ile
            20                  25                  30

Tyr Gly Glu Arg Ser Thr Ile His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Glu Arg Gly Val Ala Glu Val Val Thr Thr Leu Arg Asp Leu Pro
    50                  55                  60

Lys Lys Gly Asp Cys Arg Ser Gly Asn His Arg Gly Pro Val Ser Gly
65                  70                  75                  80

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

Val Tyr His Arg Ala Pro Leu Glu Leu Phe Val Glu Thr Gln Phe Cys
            100                 105                 110
```

```
Glu Val Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Gly Arg Leu
        115                 120                 125

Tyr His Leu Tyr Ile Cys Ser Asp Gly Cys Ile Leu Leu Lys Thr Ala
    130                 135                 140

Ser Lys Thr Arg Ser Ala Val Leu Lys Trp Thr Arg Asn Ile Leu Asp
145                 150                 155                 160

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

Thr Asn Glu Lys Lys Pro Asp Arg Val Arg Arg Gly Ala Met Lys Ile
            180                 185                 190

Thr Pro Lys Glu Ser Glu Lys Asp Ser Arg Ser Lys Pro Pro Asp Ala
        195                 200                 205

Thr Ile Val Val Glu Gly Ile Lys Tyr Gln Val Lys Lys Lys Gly Lys
    210                 215                 220

Val Lys Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys Asn Lys
225                 230                 235                 240

Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala
                245                 250                 255

Ile Ile Ala Ile Phe Met Trp Glu Pro Val Ala Pro Glu Asn Val Thr
            260                 265                 270

Gln Trp Asn Leu Ser Asp Asn Gly Thr Thr Gly Ile Gln Leu Leu Met
        275                 280                 285

Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro Glu Lys
    290                 295                 300

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

Gly Ile Gln Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr Thr Cys
                325                 330                 335

Cys Arg Leu Gln Arg His Glu Trp Asn Lys Tyr Gly Trp Cys Asn Trp
            340                 345                 350
```

```
Tyr Asn Ile Asn Pro Trp Ile Trp Leu Met Asn Lys Thr Gln Ala Asn
        355                 360                 365

Leu Thr Glu Gly Pro Pro Glu Lys Glu Cys Ala Val Thr Cys Arg Phe
    370                 375                 380

Asp Lys Glu Ala Asp Ile Asn Ile Val Thr Gln Ala Arg Asp Arg Pro
385                 390                 395                 400

Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Lys Phe Ser Phe Ala Gly
                405                 410                 415

Met Ile Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp Ile
            420                 425                 430

Leu Phe Gly Asp Asn Glu Cys Ser Ser Leu Phe Gln Asp Thr Ala Leu
        435                 440                 445

Tyr Val Val Asp Gly Val Thr Asn Thr Val Glu Asn Ala Arg Gln Gly
    450                 455                 460

Ala Ala Lys Leu Thr Ser Trp Leu Gly Lys Gln Leu Gly Ile Met Gly
465                 470                 475                 480

Lys Lys Leu Glu His Lys Ser Lys Thr Trp Phe Gly Ala Asn Ala Gln
                485                 490                 495

Ser Pro Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Val Trp Tyr Thr
            500                 505                 510

Asn Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile Gly
        515                 520                 525

Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu
    530                 535                 540

Met Arg Gly His Ile Ser Glu Phe Ile Leu Leu Ser Leu Val Val Leu
545                 550                 555                 560

Ser Asp Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Val Leu His
                565                 570                 575
```

```
Phe Ala Leu Pro Gln Thr His Glu Val Pro Ser Val Cys Asp Thr Asn
            580                 585                 590

Gln Leu Asn Leu Thr Val Ser Leu Arg Val Asp Asp Val Ile Pro Ser
        595                 600                 605

Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp Trp Trp
    610                 615                 620

Pro Tyr Glu Thr Thr Met Val Leu Leu Phe Glu Glu Ala Gly Gln Val
625                 630                 635                 640

Val Lys Leu Val Leu Arg Ala Ile Arg Asp Leu Thr Arg Val Trp Asn
                645                 650                 655

Ser Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Val Lys Val Leu Arg
            660                 665                 670

Gly Gln Val Val Gln Gly Leu Val Trp Leu Leu Leu Val Thr Gly Ala
        675                 680                 685

Gln Gly Gln Phe Ala Cys Arg Glu Asp Tyr Arg Tyr Ala Leu Ala Arg
    690                 695                 700

Thr Lys Glu Ile Gly Ala Leu Gly Ala Glu Ser Leu Thr Thr Thr Trp
705                 710                 715                 720

Thr Asp Tyr Arg Gly Asn Leu Glu Leu Asp Asp Gly Thr Val Arg Ala
                725                 730                 735

Thr Cys Ser Arg Gly Phe Phe Arg Phe Arg Gly His Cys Met Ile Gly
            740                 745                 750

Pro Arg Tyr Leu Ala Ser Leu His Leu Arg Ala Leu Pro Thr Ser Val
        755                 760                 765

Thr Phe Glu Leu Ile Pro Gly Gly Ser Ala Met Thr Glu Glu Glu Met
    770                 775                 780

Gly Asp Asp Phe Glu Phe Gly Leu Cys Pro Cys Asp Ser Arg Pro Val
785                 790                 795                 800

Val Lys Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Gln
                805                 810                 815
```

```
Leu Ile Cys Pro Tyr Gly Trp Val Gly Arg Val Glu Cys Thr Thr Val
            820                 825                 830

Ser Lys Ser Thr Leu Ala Thr Glu Val Val Lys Ile Tyr Lys Lys Thr
        835                 840                 845

Lys Pro Phe Pro Gln Arg Val Gly Cys Asp His Thr Thr Val Tyr Lys
    850                 855                 860

Gln Asp Leu Tyr His Cys Gln Met Gly Gly Asn Trp Thr Cys Met Arg
865                 870                 875                 880

Gly Glu Val Val Lys Tyr Val Gly Gly Pro Val Lys Lys Cys Glu Trp
                885                 890                 895

Cys Gly Tyr Val Phe Lys Lys Arg Glu Gly Leu Pro His Tyr Pro Ile
            900                 905                 910

Gly Arg Cys Met Leu Arg Asn Glu Thr Gly Tyr Arg Ser Val Asp Asp
        915                 920                 925

Thr Pro Cys Asp Arg Gly Gly Val Val Ile Ser Lys Thr Gly Glu Leu
    930                 935                 940

Glu Cys Leu Ile Gly Lys Thr Thr Val Lys Val Phe Ser Ser Asp Lys
945                 950                 955                 960

Lys Leu Gly Pro Met Pro Cys Arg Pro Lys Glu Val Ile Ser Ser Glu
                965                 970                 975

Gly Pro Val Ser Lys Ile Ala Cys Thr Phe Asn Tyr Ser Lys Thr Leu
            980                 985                 990

Glu Asn Lys Tyr Tyr Glu Pro Arg  Asp Ser Tyr Phe Gln  Gln Tyr Met
        995                 1000                1005

Leu Lys  Gly Gln Tyr Gln Tyr  Trp Phe Asp Leu Glu  Ala Thr Asp
    1010                1015                1020

His His  Ser Asp Tyr Phe Ala  Glu Phe Ile Met Leu  Ala Val Val
    1025                1030                1035
```

```
Ala Leu  Leu Gly Gly Arg Tyr  Val Leu Trp Leu Met  Val Val Tyr
    1040                 1045                 1050

Met Ile  Leu Ala Asp Gln Met  Thr Ser Ala Ile Asn  Leu Gly Gln
    1055                 1060                 1065

Gly Glu  Val Val Leu Ile Gly  Asn Leu Ile Thr His  Glu Asp His
    1070                 1075                 1080

Glu Val  Val Val Tyr Phe Leu  Leu Leu Tyr Leu Ile  Val Lys Asp
    1085                 1090                 1095

Glu Pro  Val Lys Lys Trp Ile  Leu Phe Leu Phe His  Ala Met Thr
    1100                 1105                 1110

Asn Asn  Pro Val Lys Thr Ile  Ser Val Gly Leu Leu  Met Leu Ser
    1115                 1120                 1125

Gly Leu  Val Lys Gly Glu Gly  Ala Gly Met Thr Tyr  Trp Glu Gly
    1130                 1135                 1140

Leu Asp  Leu Gln Phe Thr Leu  Leu Val Met Ile Thr  Ala Ser Leu
    1145                 1150                 1155

Leu Val  Ala Arg Arg Asp Val  Thr Thr Tyr Pro Leu  Ile Ile Thr
    1160                 1165                 1170

Val Ile  Ala Leu Lys Thr Thr  Trp Val Asn Ser Gly  Pro Gly Ile
    1175                 1180                 1185

Asp Ala  Ala Ile Ala Thr Ile  Thr Thr Gly Leu Leu  Met Trp Thr
    1190                 1195                 1200

Phe Ile  Ser Asp Tyr Tyr Lys  Tyr Lys Gln Trp Thr  Gln Phe Leu
    1205                 1210                 1215

Ile Ser  Ile Val Ser Gly Ile  Phe Leu Ile Arg Thr  Leu Lys Trp
    1220                 1225                 1230

Ile Gly  Gly Leu Glu Leu His  Ala Pro Glu Leu Pro  Ser Tyr Arg
    1235                 1240                 1245

Pro Leu  Phe Phe Ile Leu Thr  Tyr Leu Ile Ser Ala  Ala Ile Val
    1250                 1255                 1260
```

```
Thr Arg  Trp Asn Leu Asp Ile  Ala Gly Val Leu Leu  Gln Cys Val
    1265                 1270                 1275

Pro Thr  Ile Leu Met Val Leu  Thr Leu Trp Ala Asp  Leu Leu Thr
    1280                 1285                 1290

Leu Ile  Leu Ile Leu Pro Thr  Tyr Glu Leu Ala Lys  Leu Tyr Tyr
    1295                 1300                 1305

Leu Lys  Gly Val Lys Asn Gly  Met Glu Arg Asn Trp  Leu Gly Arg
    1310                 1315                 1320

Ile Thr  Tyr Lys Arg Val Ser  Asp Val Tyr Glu Ile  Asp Glu Ser
    1325                 1330                 1335

Gln Glu  Ala Val Tyr Leu Phe  Pro Ser Lys Gln Lys  Glu Gly Thr
    1340                 1345                 1350

Ile Thr  Gly Gly Leu Leu Pro  Leu Ile Lys Ala Ile  Leu Ile Ser
    1355                 1360                 1365

Cys Ile  Ser Ser Lys Trp Gln  Cys Phe Tyr Leu Leu  Tyr Leu Val
    1370                 1375                 1380

Val Glu  Val Ser Tyr Tyr Leu  His Lys Lys Ile Ile  Glu Glu Val
    1385                 1390                 1395

Ala Gly  Gly Thr Asn Leu Ile  Ser Arg Leu Val Ala  Ala Leu Leu
    1400                 1405                 1410

Glu Val  Asn Trp Arg Phe Asp  Asn Glu Glu Thr Lys  Gly Leu Lys
    1415                 1420                 1425

Lys Phe  Tyr Leu Ile Ser Gly  Gln Val Lys Asn Leu  Ile Ile Lys
    1430                 1435                 1440

His Lys  Val Arg Asn Glu Val  Val Ala His Trp Phe  Asn Glu Glu
    1445                 1450                 1455

Glu Val  Tyr Gly Met Pro Lys  Leu Val Ser Val Val  Lys Ala Ala
    1460                 1465                 1470
```

```
Thr Leu  Asn Arg Ser Arg His  Cys Ile Leu Cys Thr  Val Cys Glu
    1475                 1480                 1485

Ser Arg  Asp Trp Lys Gly Glu  Thr Cys Pro Lys Cys  Gly Arg Phe
    1490                 1495                 1500

Gly Pro  Ser Leu Ser Cys Gly  Met Thr Leu Ser Asp  Phe Glu Glu
    1505                 1510                 1515

Arg His  Tyr Lys Lys Ile Phe  Ile Arg Glu Asp Gln  Ser Asp Gly
    1520                 1525                 1530

Pro Phe  Arg Glu Glu Tyr Lys  Gly Tyr Leu Gln Tyr  Lys Ala Arg
    1535                 1540                 1545

Gly Gln  Leu Phe Leu Arg Asn  Leu Pro Ile Leu Ala  Thr Lys Val
    1550                 1555                 1560

Lys Leu  Leu Leu Val Gly Asn  Leu Gly Ser Glu Val  Gly Asp Leu
    1565                 1570                 1575

Glu His  Leu Gly Trp Ile Leu  Arg Gly Pro Ala Val  Cys Lys Lys
    1580                 1585                 1590

Ile Ile  Asp His Glu Arg Cys  His Val Ser Ile Met  Asp Lys Leu
    1595                 1600                 1605

Thr Ala  Phe Phe Gly Ile Met  Pro Arg Gly Thr Thr  Pro Arg Ala
    1610                 1615                 1620

Pro Ile  Arg Phe Pro Thr Ser  Leu Leu Arg Ile Arg  Arg Gly Leu
    1625                 1630                 1635

Glu Thr  Gly Trp Ala Tyr Thr  His Gln Gly Gly Ile  Ser Ser Val
    1640                 1645                 1650

Asp His  Val Thr Ala Gly Lys  Asp Leu Leu Val Cys  Asp Ser Met
    1655                 1660                 1665

Gly Arg  Thr Arg Val Val Cys  Gln Ser Asn Asn Arg  Met Thr Asp
    1670                 1675                 1680

Glu Thr  Glu Tyr Gly Val Lys  Thr Asp Ser Gly Cys  Pro Glu Gly
    1685                 1690                 1695
```

```
Ala Arg  Cys Tyr Val Phe Asn  Pro Glu Ala Val Asn  Ile Ser Gly
    1700                 1705                 1710

Thr Lys  Gly Ala Met Val His  Leu Gln Lys Thr Gly  Gly Glu Phe
    1715                 1720                 1725

Thr Cys  Val Thr Ala Ser Gly  Thr Pro Ala Phe Phe  Asp Leu Lys
    1730                 1735                 1740

Asn Leu  Lys Gly Trp Ser Gly  Leu Pro Ile Phe Glu  Ala Ser Ser
    1745                 1750                 1755

Gly Arg  Val Val Gly Arg Val  Lys Val Gly Lys Asn  Glu Glu Ser
    1760                 1765                 1770

Lys Pro  Thr Lys Leu Met Ser  Gly Ile Gln Thr Val  Ser Lys Ser
    1775                 1780                 1785

Thr Thr  Asp Leu Thr Asp Met  Val Lys Lys Ile Thr  Thr Met Asn
    1790                 1795                 1800

Arg Gly  Glu Phe Lys Gln Ile  Thr Leu Ala Thr Gly  Ala Gly Lys
    1805                 1810                 1815

Thr Thr  Glu Leu Pro Arg Ala  Val Ile Glu Glu Ile  Gly Arg His
    1820                 1825                 1830

Lys Arg  Val Leu Val Leu Ile  Pro Leu Arg Ala Ala  Ala Glu Ser
    1835                 1840                 1845

Val Tyr  Gln Tyr Met Arg Gln  Lys His Pro Ser Ile  Ala Phe Asn
    1850                 1855                 1860

Leu Arg  Ile Gly Glu Met Lys  Glu Gly Asp Met Ala  Thr Gly Ile
    1865                 1870                 1875

Thr Tyr  Ala Ser Tyr Gly Tyr  Phe Cys Gln Met Pro  Gln Pro Lys
    1880                 1885                 1890

Leu Arg  Ala Ala Met Val Glu  Tyr Ser Tyr Ile Phe  Leu Asp Glu
    1895                 1900                 1905
```

```
Tyr His  Cys Ala Thr Pro Glu  Gln Leu Ala Ile Ile  Gly Lys Ile
    1910                 1915                 1920

His Arg  Phe Ser Glu Gln Leu  Arg Val Val Ala Met  Thr Ala Thr
    1925                 1930                 1935

Pro Ala  Gly Thr Val Thr Thr  Thr Gly Gln Lys His  Pro Ile Glu
    1940                 1945                 1950

Glu Phe  Ile Ala Pro Glu Val  Met Lys Gly Glu Asp  Leu Gly Ser
    1955                 1960                 1965

Glu Phe  Leu Glu Ile Ala Gly  Leu Lys Ile Pro Thr  Glu Glu Met
    1970                 1975                 1980

Lys Gly  Asn Met Leu Val Phe  Val Pro Thr Arg Asn  Met Ala Val
    1985                 1990                 1995

Glu Thr  Ala Lys Lys Leu Lys  Ala Lys Gly Tyr Asn  Ser Gly Tyr
    2000                 2005                 2010

Tyr Tyr  Ser Gly Glu Asp Pro  Ala Asn Leu Arg Val  Val Thr Ser
    2015                 2020                 2025

Gln Ser  Pro Tyr Val Val Val  Ala Thr Asn Ala Ile  Glu Ser Gly
    2030                 2035                 2040

Val Thr  Leu Pro Asp Leu Asp  Val Val Val Asp Thr  Gly Leu Lys
    2045                 2050                 2055

Cys Glu  Lys Arg Ile Arg Leu  Ser Ser Lys Met Pro  Phe Ile Val
    2060                 2065                 2070

Thr Gly  Leu Lys Arg Met Ala  Val Thr Ile Gly Glu  Gln Ala Gln
    2075                 2080                 2085

Arg Arg  Gly Arg Val Gly Arg  Val Lys Pro Gly Arg  Tyr Tyr Arg
    2090                 2095                 2100

Ser Gln  Glu Thr Ala Val Gly  Ser Lys Asp Tyr His  Tyr Asp Leu
    2105                 2110                 2115

Leu Gln  Ala Gln Arg Tyr Gly  Ile Glu Asp Gly Ile  Asn Ile Thr
    2120                 2125                 2130
```

```
Lys Ser  Phe Arg Glu Met Asn  Tyr Asp Trp Ser Leu  Tyr Glu Glu
    2135                2140                2145

Asp Ser  Leu Met Ile Thr Gln  Leu Glu Ile Leu Asn  Asn Leu Leu
    2150                2155                2160

Ile Ser  Glu Glu Leu Pro Val  Ala Val Lys Asn Ile  Met Ala Arg
    2165                2170                2175

Thr Asp  His Pro Glu Pro Ile  Gln Leu Ala Tyr Asn  Ser Tyr Glu
    2180                2185                2190

Val Gln  Val Pro Val Leu Phe  Pro Lys Ile Arg Asn  Gly Glu Val
    2195                2200                2205

Thr Asp  Ser Tyr Asp Ser Tyr  Ser Phe Leu Asn Ala  Arg Lys Leu
    2210                2215                2220

Gly Asp  Asp Val Pro Ala Tyr  Val Tyr Ala Thr Glu  Asp Glu Asp
    2225                2230                2235

Leu Ala  Val Glu Leu Leu Gly  Met Asp Trp Pro Asp  Pro Gly Asn
    2240                2245                2250

Gln Gly  Thr Val Glu Thr Gly  Arg Ala Leu Lys Gln  Val Thr Gly
    2255                2260                2265

Leu Ser  Ala Ala Glu Asn Ala  Leu Leu Val Ala Leu  Phe Gly Tyr
    2270                2275                2280

Val Gly  Tyr Gln Ala Leu Ser  Lys Arg His Val Pro  Met Val Thr
    2285                2290                2295

Asp Ile  Tyr Ser Ile Glu Asp  His Arg Leu Glu Asp  Thr Thr His
    2300                2305                2310

Leu Gln  Phe Ala Pro Asn Ala  Ile Arg Thr Asp Gly  Lys Glu Thr
    2315                2320                2325

Glu Leu  Lys Glu Leu Ala Gln  Gly Asp Ile Gln Arg  Cys Ala Glu
    2330                2335                2340
```

```
Ala Met  Val Gly Tyr Ala Gln  Gln Gly Val Gln Phe  Ile Lys Thr
    2345                 2350                 2355

Gln Ala  Leu Lys Val Gln Glu  Asn His Val Phe Lys  Asp Ser Ala
    2360                 2365                 2370

Asp Thr  Ile Val Glu Tyr Val  Asp Lys Phe Met Lys  Ala Ile Ala
    2375                 2380                 2385

Glu Ser  Lys Asp Asp Ile Leu  Arg Tyr Gly Leu Trp  Gly Ala His
    2390                 2395                 2400

Thr Ala  Leu Tyr Lys Ser Ile  Gly Ala Arg Leu Gly  Tyr Glu Thr
    2405                 2410                 2415

Ala Phe  Ala Thr Leu Val Ile  Lys Trp Leu Ala Phe  Gly Gly Glu
    2420                 2425                 2430

Ser Ile  Asn Asp His Val Lys  Gln Ala Ala Thr Asp  Leu Val Val
    2435                 2440                 2445

Tyr Tyr  Ile Ile Asn Arg Pro  Gln Phe Pro Gly Asp  Thr Glu Thr
    2450                 2455                 2460

Gln Gln  Glu Gly Arg Lys Phe  Val Ala Ser Leu Leu  Val Ser Ala
    2465                 2470                 2475

Leu Ala  Thr Tyr Thr Tyr Lys  Ser Trp Asn Tyr Ser  Asn Leu Ser
    2480                 2485                 2490

Lys Val  Val Glu Pro Ala Leu  Ala Cys Leu Pro Tyr  Ala Ser Gln
    2495                 2500                 2505

Ala Leu  Lys Leu Phe Ala Pro  Thr Arg Leu Glu Ser  Val Val Ile
    2510                 2515                 2520

Leu Ser  Thr Ala Ile Tyr Lys  Thr Tyr Leu Ala Ile  Arg Arg Gly
    2525                 2530                 2535

Arg Ser  Asp Gly Leu Leu Gly  Thr Gly Val Ser Ala  Ala Met Glu
    2540                 2545                 2550

Ile Met  Ser Gln Asn Pro Val  Ser Val Gly Ile Ala  Val Met Leu
    2555                 2560                 2565
```

```
Gly Val  Gly Ala Val Ala Ala  His Asn Ala Ile Glu  Ser Ser Glu
    2570                 2575                 2580

Gln Lys  Arg Thr Leu Leu Met  Lys Val Phe Val Lys  Asn Phe Leu
    2585                 2590                 2595

Asp Gln  Ala Ala Thr Asp Glu  Leu Val Lys Glu Ser  Pro Glu Lys
    2600                 2605                 2610

Ile Ile  Thr Ala Leu Phe Glu  Ala Val Gln Thr Val  Gly Asn Pro
    2615                 2620                 2625

Leu Arg  Leu Ile Tyr His Leu  Tyr Gly Val Phe Tyr  Lys Gly Trp
    2630                 2635                 2640

Glu Ala  Lys Glu Val Ala Glu  Lys Thr Ala Gly Arg  Asn Leu Phe
    2645                 2650                 2655

Thr Leu  Ile Met Phe Glu Ala  Val Glu Leu Leu Gly  Val Asp Ser
    2660                 2665                 2670

Glu Gly  Lys Met Arg Arg Leu  Ser Gly Asn Tyr Leu  Ile Glu Leu
    2675                 2680                 2685

Leu Gln  Lys Leu His Asp Gly  Phe Arg Ile Ser Ile  Lys Lys Phe
    2690                 2695                 2700

Ala Leu  Gly Trp Ala Pro Gly  Pro Phe Ser Cys Asn  Trp Thr Pro
    2705                 2710                 2715

Ala Asp  Asn Arg Ile Arg Leu  Pro His Glu Asn Tyr  Leu Arg Val
    2720                 2725                 2730

Val Thr  Arg Cys Arg Cys Gly  Tyr Arg Thr Lys Ala  Val Lys Asn
    2735                 2740                 2745

Cys Ala  Gly Glu Leu Ile Leu  Glu Glu Glu Glu Gly  Ser Phe Phe
    2750                 2755                 2760

Cys Arg  Asn Lys Phe Gly Arg  Gly Ala Pro Asn Tyr  Lys Val Thr
    2765                 2770                 2775
```

```
Lys Phe  Tyr Asp Gly Asn Leu  Glu Glu Ile Arg Ala  Arg Leu Lys
    2780                 2785                 2790

Leu Glu  Gly Gln Val Glu Met  Tyr Tyr Lys Gly Ala  Thr Ile Lys
    2795                 2800                 2805

Ile Asp  Tyr Ser Asn Asn Lys  Leu Ile Leu Ala Thr  Asp Lys Trp
    2810                 2815                 2820

Glu Val  Glu His Ser Tyr Ile  Thr Arg Leu Thr Lys  Arg Tyr Thr
    2825                 2830                 2835

Gly Ala  Gly Tyr Lys Gly Ala  Phe Leu Gly Asp Glu  Pro Asn His
    2840                 2845                 2850

Lys Ser  Leu Ile Glu Arg Thr  Cys Ala Thr Val Cys  Lys Asp Lys
    2855                 2860                 2865

Ile Tyr  Phe Ser Lys Met Lys  Lys Gly Cys Ala Phe  Thr Tyr Asp
    2870                 2875                 2880

Leu Ser  Leu Ser Asn Leu Val  Arg Leu Val Asp Leu  Val His Arg
    2885                 2890                 2895

Asn Lys  Leu Glu Glu Lys Asp  Ile Pro Glu Arg Thr  Val Thr Thr
    2900                 2905                 2910

Trp Leu  Ala Tyr Thr Phe Val  Asn Glu Asp Val Gly  Thr Ile Lys
    2915                 2920                 2925

Pro Val  Leu Gly Glu Lys Val  Ile Pro Glu Glu Ser  Asp Glu Ile
    2930                 2935                 2940

Asn Leu  Gln Pro Thr Val Thr  Val Asn Met Ser Lys  Cys Gln Val
    2945                 2950                 2955

Thr Val  Val Gly Glu Ala Lys  Asn Met Thr Thr Gly  Val Val Pro
    2960                 2965                 2970

Leu Thr  Val Thr Lys Glu Ala  Cys Asn Gly Gln Asp  Arg Ser Val
    2975                 2980                 2985

Leu Asn  Ile Gly Met Glu Glu  Gly Glu Tyr Pro Gly  Pro Ala Val
    2990                 2995                 3000
```

```
Ser Thr  Val Thr Val Gly Glu  Ala Val Gln Ser Lys  Asp Val Arg
    3005                 3010                 3015

Pro Tyr  Val Leu Val Ile Gly  Ser Asn Lys Ala Thr  Ser Asn Arg
    3020                 3025                 3030

Ala Lys  Thr Ala Lys Asn Val  Lys Leu Tyr Lys Gly  Gly Asp Ala
    3035                 3040                 3045

Val Glu  Val Arg Asp Leu Ile  Lys Lys Gly Glu Met  Leu Val Val
    3050                 3055                 3060

Ala Leu  Ala Asp Val Glu Gln  Asp Leu Leu Glu Tyr  Val Asp Tyr
    3065                 3070                 3075

Lys Gly  Thr Phe Leu Thr Arg  Glu Thr Leu Glu Ala  Leu Ser Leu
    3080                 3085                 3090

Gly Lys  Pro Lys Ala Lys Asn  Ile Thr Lys Ala Asp  Ala His Arg
    3095                 3100                 3105

Leu Leu  Asn Pro Glu Lys Glu  Gln Ile Gly Leu Pro  Asp Trp Phe
    3110                 3115                 3120

Thr Ala  Thr Glu Pro Ile Phe  Leu Glu Ala Met Ile  Lys Gln Glu
    3125                 3130                 3135

Lys Tyr  His Ile Thr Gly Asp  Val Ala Thr Val Lys  Asp Lys Ala
    3140                 3145                 3150

Lys Gln  Leu Gly Ala Thr Asp  Ser Thr Arg Ile Val  Lys Glu Val
    3155                 3160                 3165

Gly Ala  Arg Val Tyr Thr Met  Lys Leu Asn Ser Trp  Ala Leu Gln
    3170                 3175                 3180

Ala Glu  Arg Gly Asp Ala Asn  Leu Lys Pro Leu Phe  Glu Glu Leu
    3185                 3190                 3195

Leu Leu  Gln Cys Pro Pro Gly  Arg Thr Val Lys Gly  Gly Thr Met
    3200                 3205                 3210
```

```
Val Ser  Ala Tyr Gln Leu Ala  Gln Gly Asn Trp Thr  Pro Thr Ser
    3215                 3220                 3225

Cys Lys  Val Tyr Met Gly Thr  Ile Thr Ala Lys Arg  Val Lys Ile
    3230                 3235                 3240

His Pro  Tyr Glu Ala Tyr Ile  Lys Leu Lys Glu Leu  Ile Glu Glu
    3245                 3250                 3255

Tyr Asn  Met Lys Arg Val Thr  Gly Asp Thr Gly Leu  Lys Arg His
    3260                 3265                 3270

Asn Glu  Trp Ile Leu Lys Arg  Ile Lys His His Gly  Asn Leu Arg
    3275                 3280                 3285

Thr Lys  Lys Ile Leu Asn Pro  Gly Lys Val Ala Glu  Gln Leu Ser
    3290                 3295                 3300

Arg Glu  Gly His Lys His Asn  Val Tyr Asn Lys Ile  Ile Gly Ser
    3305                 3310                 3315

Thr Met  Ala Ser Val Gly Ile  Lys Leu Glu Lys Leu  Pro Val Val
    3320                 3325                 3330

Arg Ala  Gln Thr Asp Thr Thr  Phe Phe His Gln Ala  Ile Arg Asp
    3335                 3340                 3345

Lys Ile  Asp Lys Glu Glu Asn  Pro Gln Thr Pro Asp  Leu His Lys
    3350                 3355                 3360

Glu Leu  Lys Glu Val Phe Asn  Ala Leu Lys Ile Pro  Glu Leu Ala
    3365                 3370                 3375

Ala Thr  Tyr Asp Ala Val Glu  Trp Glu Glu Leu Glu  Thr Gly Ile
    3380                 3385                 3390

Asn Arg  Lys Gly Ala Ala Gly  Phe Phe Glu Arg Lys  Asn Ile Gly
    3395                 3400                 3405

Glu Ile  Leu Asp Thr Glu Lys  Asn Lys Val Glu Asp  Ile Ile Arg
    3410                 3415                 3420

Asp Leu  Lys Ser Gly Arg Pro  Ile Lys Tyr Tyr Glu  Thr Ala Ile
    3425                 3430                 3435
```

```
Pro Lys  Asn Glu Lys Arg Asp  Val Asn Asp Asp Trp  Glu Ser Gly
    3440                 3445                 3450

Asp Phe  Val Asp Glu Lys Lys  Pro Arg Val Ile Gln  Tyr Pro Glu
    3455                 3460                 3465

Ala Lys  Val Arg Leu Ala Ile  Thr Lys Val Met Tyr  Lys Trp Val
    3470                 3475                 3480

Lys Gln  Lys Pro Val Val Ile  Pro Gly Tyr Glu Gly  Lys Thr Pro
    3485                 3490                 3495

Leu Phe  Glu Ile Phe Asp Lys  Val Lys Lys Glu Trp  Gly Ser Phe
    3500                 3505                 3510

Asp Asn  Pro Val Ala Val Ser  Phe Asp Thr Lys Ala  Trp Asp Thr
    3515                 3520                 3525

Gln Val  Thr Ser Lys Ser Leu  Glu Leu Ile Arg Asp  Ile Gln Lys
    3530                 3535                 3540

Tyr Tyr  Phe Lys Lys Glu Trp  His Lys Phe Ile Glu  Thr Ile Thr
    3545                 3550                 3555

Glu His  Met Val Glu Val Pro  Val Val Thr Ala Asp  Gly Glu Val
    3560                 3565                 3570

Tyr Ile  Ser Glu Gly Gln Arg  Gly Ser Gly Gln Pro  Asp Thr Ser
    3575                 3580                 3585

Ala Gly  Asn Ser Met Leu Asn  Val Leu Thr Met Val  Tyr Ala Phe
    3590                 3595                 3600

Cys Arg  Ala Thr Gly Val Pro  Tyr Lys Ser Phe Lys  Arg Val Ala
    3605                 3610                 3615

Lys Ile  His Val Cys Gly Asp  Asp Gly Phe Leu Ile  Thr Glu Lys
    3620                 3625                 3630

Ser Leu  Gly Glu Lys Phe Ala  Ser Lys Gly Ile Gln  Ile Leu His
    3635                 3640                 3645
```

```
Glu Ala  Gly Lys Pro Gln Lys  Ile Thr Glu Gly Asp  Arg Met Lys
    3650                 3655                 3660

Val Ala  Tyr Lys Phe Glu Asp  Ile Glu Phe Cys Ser  His Thr Pro
    3665                 3670                 3675

Val Pro  Val Arg Trp Ser Asp  Asn Thr Thr Ser Tyr  Met Pro Gly
    3680                 3685                 3690

Arg Asn  Thr Ala Thr Ile Leu  Ala Lys Met Ala Thr  Arg Leu Asp
    3695                 3700                 3705

Ser Ser  Gly Glu Arg Gly Thr  Thr Ala Tyr Glu Lys  Ala Val Ala
    3710                 3715                 3720

Phe Ser  Phe Leu Leu Met Tyr  Ser Trp Asn Pro Leu  Val Arg Arg
    3725                 3730                 3735

Ile Cys  Leu Leu Thr Leu Ser  Ser Glu Leu Gly Thr  Lys Pro Ser
    3740                 3745                 3750

Lys Arg  Thr Thr Tyr Tyr Tyr  Glu Gly Asp Pro Ile  Ser Ala Tyr
    3755                 3760                 3765

Arg Glu  Val Ile Gly His Asn  Leu Leu Asp Leu Lys  Arg Thr Gly
    3770                 3775                 3780

Leu Glu  Lys Leu Ala Leu Leu  Asn Leu Ser Met Ser  Thr Leu Gly
    3785                 3790                 3795

Ile Trp  Thr Lys His Ile Ser  Lys Arg Leu Leu Gln  Asp Cys Val
    3800                 3805                 3810

Asp Val  Gly Ser Lys Asp Gly  Asn Trp Leu Val Asn  Ala Asp Arg
    3815                 3820                 3825

Pro Glu  Ser Arg Lys Thr Gly  Lys Val Tyr Leu Gln  Ser Gly Gly
    3830                 3835                 3840

His Thr  Val Arg Gly Arg His  Tyr Glu Asp Leu Ile  Leu Pro Arg
    3845                 3850                 3855

Met Val  Lys Pro Thr Phe Gln  Gly Val Asp Arg Tyr  Lys Leu Gly
    3860                 3865                 3870
```

```
Pro Ile  Val Asn Val Ile Phe  Arg Arg Leu Arg Val  Met Met Met
    3875                3880                3885

Ala Leu  Val Gly Arg Gly Met
    3890                3895
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<211> 3894
<212> PRT
<213> BDV

<400> 11

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Met Glu Leu Asn Lys Phe Glu Leu Leu Tyr Lys Thr Ser Lys Gln Lys
1               5                  10                  15

Pro Val Gly Val Thr Glu Pro Ile Tyr Asp Ser Ala Gly Asn Pro Ile
            20                  25                  30

Tyr Gly Glu Arg Ser Thr Ile His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Glu Arg Gly Val Ala Glu Val Val Thr Thr Leu Arg Asp Leu Pro
    50                  55                  60

Lys Lys Gly Asp Cys Arg Ser Gly Asn His Arg Gly Pro Val Ser Gly
65                  70                  75                  80

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

Val Tyr His Arg Ala Pro Leu Glu Leu Phe Val Glu Thr Gln Phe Cys
            100                 105                 110

Glu Val Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Gly Arg Leu
        115                 120                 125

Tyr His Leu Tyr Ile Cys Ser Asp Gly Cys Ile Leu Leu Lys Thr Ala
    130                 135                 140

Ser Lys Thr Arg Ser Ala Val Leu Lys Trp Thr Arg Asn Ile Leu Asp
145                 150                 155                 160

Cys Pro Leu Trp Val Thr Ser Cys Ser Asp Asp Asn Lys Ser Glu Lys
```

```
                165                 170                 175

Thr Asn Glu Lys Lys Pro Asp Arg Val Arg Arg Gly Ala Met Lys Ile
            180                 185                 190

Thr Pro Lys Glu Ser Glu Lys Asp Ser Arg Ser Lys Pro Pro Asp Ala
        195                 200                 205

Thr Ile Val Val Glu Gly Ile Lys Tyr Gln Val Lys Lys Lys Gly Lys
    210                 215                 220

Val Lys Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys Asn Lys
225                 230                 235                 240

Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala
                245                 250                 255

Ile Ile Ala Ile Phe Met Trp Glu Pro Val Ala Pro Glu Asn Val Thr
            260                 265                 270

Gln Trp Asn Leu Ser Asp Asn Gly Thr Thr Gly Ile Gln Leu Leu Met
        275                 280                 285

Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro Glu Lys
    290                 295                 300

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

Gly Ile Gln Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr Thr Cys
                325                 330                 335

Cys Arg Leu Gln Arg His Glu Trp Asn Lys Tyr Gly Trp Cys Asn Trp
            340                 345                 350

Tyr Asn Ile Asn Pro Trp Ile Trp Leu Met Asn Lys Thr Gln Ala Asn
        355                 360                 365

Leu Thr Glu Gly Pro Pro Glu Lys Glu Cys Ala Val Thr Cys Arg Phe
    370                 375                 380

Asp Lys Glu Ala Asp Ile Asn Ile Val Thr Gln Ala Arg Asp Arg Pro
385                 390                 395                 400
```

```
Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Lys Phe Ser Phe Ala Gly
                405                 410                 415

Met Ile Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp Ile
            420                 425                 430

Leu Phe Gly Asp Asn Glu Ser Ser Leu Phe Gln Asp Thr Ala Leu Tyr
        435                 440                 445

Val Val Asp Gly Val Thr Asn Thr Val Glu Asn Ala Arg Gln Gly Ala
    450                 455                 460

Ala Lys Leu Thr Ser Trp Leu Gly Lys Gln Leu Gly Ile Met Gly Lys
465                 470                 475                 480

Lys Leu Glu His Lys Ser Lys Thr Trp Phe Gly Ala Asn Ala Gln Ser
                485                 490                 495

Pro Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Val Trp Tyr Thr Asn
            500                 505                 510

Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile Gly Pro
        515                 520                 525

Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu Met
    530                 535                 540

Arg Gly His Ile Ser Glu Phe Ile Leu Leu Ser Leu Val Val Leu Ser
545                 550                 555                 560

Asp Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Val Leu His Phe
                565                 570                 575

Ala Leu Pro Gln Thr His Glu Val Pro Ser Val Cys Asp Thr Asn Gln
            580                 585                 590

Leu Asn Leu Thr Val Ser Leu Arg Val Asp Asp Val Ile Pro Ser Ser
        595                 600                 605

Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp Trp Trp Pro
    610                 615                 620

Tyr Glu Thr Thr Met Val Leu Leu Phe Glu Glu Ala Gly Gln Val Val
```

625 630 635 640

Lys Leu Val Leu Arg Ala Ile Arg Asp Leu Thr Arg Val Trp Asn Ser
645 650 655

Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Val Lys Val Leu Arg Gly
660 665 670

Gln Val Val Gln Gly Leu Val Trp Leu Leu Leu Val Thr Gly Ala Gln
675 680 685

Gly Gln Phe Ala Cys Arg Glu Asp Tyr Arg Tyr Ala Leu Ala Arg Thr
690 695 700

Lys Glu Ile Gly Ala Leu Gly Ala Glu Ser Leu Thr Thr Thr Trp Thr
705 710 715 720

Asp Tyr Arg Gly Asn Leu Glu Leu Asp Asp Gly Thr Val Arg Ala Thr
725 730 735

Cys Ser Arg Gly Phe Phe Arg Phe Arg Gly His Cys Met Ile Gly Pro
740 745 750

Arg Tyr Leu Ala Ser Leu His Leu Arg Ala Leu Pro Thr Ser Val Thr
755 760 765

Phe Glu Leu Ile Pro Gly Gly Ser Ala Met Thr Glu Glu Glu Met Gly
770 775 780

Asp Asp Phe Glu Phe Gly Leu Cys Pro Cys Asp Ser Arg Pro Val Val
785 790 795 800

Lys Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Gln Leu
805 810 815

Ile Cys Pro Tyr Gly Trp Val Gly Arg Val Glu Cys Thr Thr Val Ser
820 825 830

Lys Ser Thr Leu Ala Thr Glu Val Val Lys Ile Tyr Lys Lys Thr Lys
835 840 845

Pro Phe Pro Gln Arg Val Gly Cys Asp His Thr Thr Val Tyr Lys Gln
850 855 860

```
Asp Leu Tyr His Cys Gln Met Gly Gly Asn Trp Thr Cys Met Arg Gly
865                 870                 875                 880

Glu Val Val Lys Tyr Val Gly Gly Pro Val Lys Lys Cys Glu Trp Cys
                885                 890                 895

Gly Tyr Val Phe Lys Lys Arg Glu Gly Leu Pro His Tyr Pro Ile Gly
            900                 905                 910

Arg Cys Met Leu Arg Asn Glu Thr Gly Tyr Arg Ser Val Asp Asp Thr
        915                 920                 925

Pro Cys Asp Arg Gly Gly Val Val Ile Ser Lys Thr Gly Glu Leu Glu
    930                 935                 940

Cys Leu Ile Gly Lys Thr Thr Val Lys Val Phe Ser Ser Asp Lys Lys
945                 950                 955                 960

Leu Gly Pro Met Pro Cys Arg Pro Lys Glu Val Ile Ser Ser Glu Gly
                965                 970                 975

Pro Val Ser Lys Ile Ala Cys Thr Phe Asn Tyr Ser Lys Thr Leu Glu
            980                 985                 990

Asn Lys Tyr Tyr Glu Pro Arg Asp  Ser Tyr Phe Gln Gln  Tyr Met Leu
        995                 1000                1005

Lys Gly  Gln Tyr Gln Tyr Trp  Phe Asp Leu Glu Ala  Thr Asp His
    1010                1015                1020

His Ser  Asp Tyr Phe Ala Glu  Phe Ile Met Leu Ala  Val Val Ala
    1025                1030                1035

Leu Leu  Gly Gly Arg Tyr Val  Leu Trp Leu Met Val  Val Tyr Met
    1040                1045                1050

Ile Leu  Ala Asp Gln Met Thr  Ser Ala Ile Asn Leu  Gly Gln Gly
    1055                1060                1065

Glu Val  Val Leu Ile Gly Asn  Leu Ile Thr His Glu  Asp His Glu
    1070                1075                1080

Val Val  Val Tyr Phe Leu Leu  Leu Tyr Leu Ile Val  Lys Asp Glu
```

1085 1090 1095

Pro Val Lys Lys Trp Ile Leu Phe Leu Phe His Ala Met Thr Asn
1100 1105 1110

Asn Pro Val Lys Thr Ile Ser Val Gly Leu Leu Met Leu Ser Gly
1115 1120 1125

Leu Val Lys Gly Glu Gly Ala Gly Met Thr Tyr Trp Glu Gly Leu
1130 1135 1140

Asp Leu Gln Phe Thr Leu Leu Val Met Ile Thr Ala Ser Leu Leu
1145 1150 1155

Val Ala Arg Arg Asp Val Thr Thr Tyr Pro Leu Ile Ile Thr Val
1160 1165 1170

Ile Ala Leu Lys Thr Thr Trp Val Asn Ser Gly Pro Gly Ile Asp
1175 1180 1185

Ala Ala Ile Ala Thr Ile Thr Thr Gly Leu Leu Met Trp Thr Phe
1190 1195 1200

Ile Ser Asp Tyr Tyr Lys Tyr Lys Gln Trp Thr Gln Phe Leu Ile
1205 1210 1215

Ser Ile Val Ser Gly Ile Phe Leu Ile Arg Thr Leu Lys Trp Ile
1220 1225 1230

Gly Gly Leu Glu Leu His Ala Pro Glu Leu Pro Ser Tyr Arg Pro
1235 1240 1245

Leu Phe Phe Ile Leu Thr Tyr Leu Ile Ser Ala Ala Ile Val Thr
1250 1255 1260

Arg Trp Asn Leu Asp Ile Ala Gly Val Leu Leu Gln Cys Val Pro
1265 1270 1275

Thr Ile Leu Met Val Leu Thr Leu Trp Ala Asp Leu Leu Thr Leu
1280 1285 1290

Ile Leu Ile Leu Pro Thr Tyr Glu Leu Ala Lys Leu Tyr Tyr Leu
1295 1300 1305

```
Lys Gly  Val Lys Asn Gly Met  Glu Arg Asn Trp Leu  Gly Arg Ile
    1310                 1315                 1320

Thr Tyr  Lys Arg Val Ser Asp  Val Tyr Glu Ile Asp  Glu Ser Gln
    1325                 1330                 1335

Glu Ala  Val Tyr Leu Phe Pro  Ser Lys Gln Lys Glu  Gly Thr Ile
    1340                 1345                 1350

Thr Gly  Gly Leu Leu Pro Leu  Ile Lys Ala Ile Leu  Ile Ser Cys
    1355                 1360                 1365

Ile Ser  Ser Lys Trp Gln Cys  Phe Tyr Leu Leu Tyr  Leu Val Val
    1370                 1375                 1380

Glu Val  Ser Tyr Tyr Leu His  Lys Lys Ile Ile Glu  Glu Val Ala
    1385                 1390                 1395

Gly Gly  Thr Asn Leu Ile Ser  Arg Leu Val Ala Ala  Leu Leu Glu
    1400                 1405                 1410

Val Asn  Trp Arg Phe Asp Asn  Glu Glu Thr Lys Gly  Leu Lys Lys
    1415                 1420                 1425

Phe Tyr  Leu Ile Ser Gly Gln  Val Lys Asn Leu Ile  Ile Lys His
    1430                 1435                 1440

Lys Val  Arg Asn Glu Val Val  Ala His Trp Phe Asn  Glu Glu Glu
    1445                 1450                 1455

Val Tyr  Gly Met Pro Lys Leu  Val Ser Val Val Lys  Ala Ala Thr
    1460                 1465                 1470

Leu Asn  Arg Ser Arg His Cys  Ile Leu Cys Thr Val  Cys Glu Ser
    1475                 1480                 1485

Arg Asp  Trp Lys Gly Glu Thr  Cys Pro Lys Cys Gly  Arg Phe Gly
    1490                 1495                 1500

Pro Ser  Leu Ser Cys Gly Met  Thr Leu Ser Asp Phe  Glu Glu Arg
    1505                 1510                 1515

His Tyr  Lys Lys Ile Phe Ile  Arg Glu Asp Gln Ser  Asp Gly Pro
```

1520 1525 1530

Phe Arg Glu Glu Tyr Lys Gly Tyr Leu Gln Tyr Lys Ala Arg Gly
1535 1540 1545

Gln Leu Phe Leu Arg Asn Leu Pro Ile Leu Ala Thr Lys Val Lys
1550 1555 1560

Leu Leu Leu Val Gly Asn Leu Gly Ser Glu Val Gly Asp Leu Glu
1565 1570 1575

His Leu Gly Trp Ile Leu Arg Gly Pro Ala Val Cys Lys Lys Ile
1580 1585 1590

Ile Asp His Glu Arg Cys His Val Ser Ile Met Asp Lys Leu Thr
1595 1600 1605

Ala Phe Phe Gly Ile Met Pro Arg Gly Thr Thr Pro Arg Ala Pro
1610 1615 1620

Ile Arg Phe Pro Thr Ser Leu Leu Arg Ile Arg Arg Gly Leu Glu
1625 1630 1635

Thr Gly Trp Ala Tyr Thr His Gln Gly Gly Ile Ser Ser Val Asp
1640 1645 1650

His Val Thr Ala Gly Lys Asp Leu Leu Val Cys Asp Ser Met Gly
1655 1660 1665

Arg Thr Arg Val Val Cys Gln Ser Asn Asn Arg Met Thr Asp Glu
1670 1675 1680

Thr Glu Tyr Gly Val Lys Thr Asp Ser Gly Cys Pro Glu Gly Ala
1685 1690 1695

Arg Cys Tyr Val Phe Asn Pro Glu Ala Val Asn Ile Ser Gly Thr
1700 1705 1710

Lys Gly Ala Met Val His Leu Gln Lys Thr Gly Gly Glu Phe Thr
1715 1720 1725

Cys Val Thr Ala Ser Gly Thr Pro Ala Phe Phe Asp Leu Lys Asn
1730 1735 1740

```
Leu Lys  Gly Trp Ser Gly Leu  Pro Ile Phe Glu Ala  Ser Ser Gly
    1745                 1750                 1755

Arg Val  Val Gly Arg Val Lys  Val Gly Lys Asn Glu  Glu Ser Lys
    1760                 1765                 1770

Pro Thr  Lys Leu Met Ser Gly  Ile Gln Thr Val Ser  Lys Ser Thr
    1775                 1780                 1785

Thr Asp  Leu Thr Asp Met Val  Lys Lys Ile Thr Thr  Met Asn Arg
    1790                 1795                 1800

Gly Glu  Phe Lys Gln Ile Thr  Leu Ala Thr Gly Ala  Gly Lys Thr
    1805                 1810                 1815

Thr Glu  Leu Pro Arg Ala Val  Ile Glu Glu Ile Gly  Arg His Lys
    1820                 1825                 1830

Arg Val  Leu Val Leu Ile Pro  Leu Arg Ala Ala Ala  Glu Ser Val
    1835                 1840                 1845

Tyr Gln  Tyr Met Arg Gln Lys  His Pro Ser Ile Ala  Phe Asn Leu
    1850                 1855                 1860

Arg Ile  Gly Glu Met Lys Glu  Gly Asp Met Ala Thr  Gly Ile Thr
    1865                 1870                 1875

Tyr Ala  Ser Tyr Gly Tyr Phe  Cys Gln Met Pro Gln  Pro Lys Leu
    1880                 1885                 1890

Arg Ala  Ala Met Val Glu Tyr  Ser Tyr Ile Phe Leu  Asp Glu Tyr
    1895                 1900                 1905

His Cys  Ala Thr Pro Glu Gln  Leu Ala Ile Ile Gly  Lys Ile His
    1910                 1915                 1920

Arg Phe  Ser Glu Gln Leu Arg  Val Val Ala Met Thr  Ala Thr Pro
    1925                 1930                 1935

Ala Gly  Thr Val Thr Thr Thr  Gly Gln Lys His Pro  Ile Glu Glu
    1940                 1945                 1950

Phe Ile  Ala Pro Glu Val Met  Lys Gly Glu Asp Leu  Gly Ser Glu
```

1955 1960 1965

Phe Leu Glu Ile Ala Gly Leu Lys Ile Pro Thr Glu Glu Met Lys
1970 1975 1980

Gly Asn Met Leu Val Phe Val Pro Thr Arg Asn Met Ala Val Glu
1985 1990 1995

Thr Ala Lys Lys Leu Lys Ala Lys Gly Tyr Asn Ser Gly Tyr Tyr
2000 2005 2010

Tyr Ser Gly Glu Asp Pro Ala Asn Leu Arg Val Val Thr Ser Gln
2015 2020 2025

Ser Pro Tyr Val Val Val Ala Thr Asn Ala Ile Glu Ser Gly Val
2030 2035 2040

Thr Leu Pro Asp Leu Asp Val Val Val Asp Thr Gly Leu Lys Cys
2045 2050 2055

Glu Lys Arg Ile Arg Leu Ser Ser Lys Met Pro Phe Ile Val Thr
2060 2065 2070

Gly Leu Lys Arg Met Ala Val Thr Ile Gly Glu Gln Ala Gln Arg
2075 2080 2085

Arg Gly Arg Val Gly Arg Val Lys Pro Gly Arg Tyr Tyr Arg Ser
2090 2095 2100

Gln Glu Thr Ala Val Gly Ser Lys Asp Tyr His Tyr Asp Leu Leu
2105 2110 2115

Gln Ala Gln Arg Tyr Gly Ile Glu Asp Gly Ile Asn Ile Thr Lys
2120 2125 2130

Ser Phe Arg Glu Met Asn Tyr Asp Trp Ser Leu Tyr Glu Glu Asp
2135 2140 2145

Ser Leu Met Ile Thr Gln Leu Glu Ile Leu Asn Asn Leu Leu Ile
2150 2155 2160

Ser Glu Glu Leu Pro Val Ala Val Lys Asn Ile Met Ala Arg Thr
2165 2170 2175

Asp His Pro Glu Pro Ile Gln Leu Ala Tyr Asn Ser Tyr Glu Val
2180 2185 2190

Gln Val Pro Val Leu Phe Pro Lys Ile Arg Asn Gly Glu Val Thr
2195 2200 2205

Asp Ser Tyr Asp Ser Tyr Ser Phe Leu Asn Ala Arg Lys Leu Gly
2210 2215 2220

Asp Asp Val Pro Ala Tyr Val Tyr Ala Thr Glu Asp Glu Asp Leu
2225 2230 2235

Ala Val Glu Leu Leu Gly Met Asp Trp Pro Asp Pro Gly Asn Gln
2240 2245 2250

Gly Thr Val Glu Thr Gly Arg Ala Leu Lys Gln Val Thr Gly Leu
2255 2260 2265

Ser Ala Ala Glu Asn Ala Leu Leu Val Ala Leu Phe Gly Tyr Val
2270 2275 2280

Gly Tyr Gln Ala Leu Ser Lys Arg His Val Pro Met Val Thr Asp
2285 2290 2295

Ile Tyr Ser Ile Glu Asp His Arg Leu Glu Asp Thr Thr His Leu
2300 2305 2310

Gln Phe Ala Pro Asn Ala Ile Arg Thr Asp Gly Lys Glu Thr Glu
2315 2320 2325

Leu Lys Glu Leu Ala Gln Gly Asp Ile Gln Arg Cys Ala Glu Ala
2330 2335 2340

Met Val Gly Tyr Ala Gln Gln Gly Val Gln Phe Ile Lys Thr Gln
2345 2350 2355

Ala Leu Lys Val Gln Glu Asn His Val Phe Lys Asp Ser Ala Asp
2360 2365 2370

Thr Ile Val Glu Tyr Val Asp Lys Phe Met Lys Ala Ile Ala Glu
2375 2380 2385

Ser Lys Asp Asp Ile Leu Arg Tyr Gly Leu Trp Gly Ala His Thr

2390 2395 2400

Ala Leu Tyr Lys Ser Ile Gly Ala Arg Leu Gly Tyr Glu Thr Ala
2405 2410 2415

Phe Ala Thr Leu Val Ile Lys Trp Leu Ala Phe Gly Gly Glu Ser
2420 2425 2430

Ile Asn Asp His Val Lys Gln Ala Ala Thr Asp Leu Val Val Tyr
2435 2440 2445

Tyr Ile Ile Asn Arg Pro Gln Phe Pro Gly Asp Thr Glu Thr Gln
2450 2455 2460

Gln Glu Gly Arg Lys Phe Val Ala Ser Leu Leu Val Ser Ala Leu
2465 2470 2475

Ala Thr Tyr Thr Tyr Lys Ser Trp Asn Tyr Ser Asn Leu Ser Lys
2480 2485 2490

Val Val Glu Pro Ala Leu Ala Cys Leu Pro Tyr Ala Ser Gln Ala
2495 2500 2505

Leu Lys Leu Phe Ala Pro Thr Arg Leu Glu Ser Val Val Ile Leu
2510 2515 2520

Ser Thr Ala Ile Tyr Lys Thr Tyr Leu Ala Ile Arg Arg Gly Arg
2525 2530 2535

Ser Asp Gly Leu Leu Gly Thr Gly Val Ser Ala Ala Met Glu Ile
2540 2545 2550

Met Ser Gln Asn Pro Val Ser Val Gly Ile Ala Val Met Leu Gly
2555 2560 2565

Val Gly Ala Val Ala Ala His Asn Ala Ile Glu Ser Ser Glu Gln
2570 2575 2580

Lys Arg Thr Leu Leu Met Lys Val Phe Val Lys Asn Phe Leu Asp
2585 2590 2595

Gln Ala Ala Thr Asp Glu Leu Val Lys Glu Ser Pro Glu Lys Ile
2600 2605 2610

```
Ile Thr  Ala Leu Phe Glu Ala  Val Gln Thr Val Gly  Asn Pro Leu
    2615                 2620                 2625

Arg Leu  Ile Tyr His Leu Tyr  Gly Val Phe Tyr Lys  Gly Trp Glu
    2630                 2635                 2640

Ala Lys  Glu Val Ala Glu Lys  Thr Ala Gly Arg Asn  Leu Phe Thr
    2645                 2650                 2655

Leu Ile  Met Phe Glu Ala Val  Glu Leu Leu Gly Val  Asp Ser Glu
    2660                 2665                 2670

Gly Lys  Met Arg Arg Leu Ser  Gly Asn Tyr Leu Ile  Glu Leu Leu
    2675                 2680                 2685

Gln Lys  Leu His Asp Gly Phe  Arg Ile Ser Ile Lys  Lys Phe Ala
    2690                 2695                 2700

Leu Gly  Trp Ala Pro Gly Pro  Phe Ser Cys Asn Trp  Thr Pro Ala
    2705                 2710                 2715

Asp Asn  Arg Ile Arg Leu Pro  His Glu Asn Tyr Leu  Arg Val Val
    2720                 2725                 2730

Thr Arg  Cys Arg Cys Gly Tyr  Arg Thr Lys Ala Val  Lys Asn Cys
    2735                 2740                 2745

Ala Gly  Glu Leu Ile Leu Glu  Glu Glu Glu Gly Ser  Phe Phe Cys
    2750                 2755                 2760

Arg Asn  Lys Phe Gly Arg Gly  Ala Pro Asn Tyr Lys  Val Thr Lys
    2765                 2770                 2775

Phe Tyr  Asp Gly Asn Leu Glu  Glu Ile Arg Ala Arg  Leu Lys Leu
    2780                 2785                 2790

Glu Gly  Gln Val Glu Met Tyr  Tyr Lys Gly Ala Thr  Ile Lys Ile
    2795                 2800                 2805

Asp Tyr  Ser Asn Asn Lys Leu  Ile Leu Ala Thr Asp  Lys Trp Glu
    2810                 2815                 2820

Val Glu  His Ser Tyr Ile Thr  Arg Leu Thr Lys Arg  Tyr Thr Gly
```

2825 2830 2835

Ala Gly Tyr Lys Gly Ala Phe Leu Gly Asp Glu Pro Asn His Lys
2840 2845 2850

Ser Leu Ile Glu Arg Thr Cys Ala Thr Val Cys Lys Asp Lys Ile
2855 2860 2865

Tyr Phe Ser Lys Met Lys Lys Gly Cys Ala Phe Thr Tyr Asp Leu
2870 2875 2880

Ser Leu Ser Asn Leu Val Arg Leu Val Asp Leu Val His Arg Asn
2885 2890 2895

Lys Leu Glu Glu Lys Asp Ile Pro Glu Arg Thr Val Thr Thr Trp
2900 2905 2910

Leu Ala Tyr Thr Phe Val Asn Glu Asp Val Gly Thr Ile Lys Pro
2915 2920 2925

Val Leu Gly Glu Lys Val Ile Pro Glu Glu Ser Asp Glu Ile Asn
2930 2935 2940

Leu Gln Pro Thr Val Thr Val Asn Met Ser Lys Cys Gln Val Thr
2945 2950 2955

Val Val Gly Glu Ala Lys Asn Met Thr Thr Gly Val Val Pro Leu
2960 2965 2970

Thr Val Thr Lys Glu Ala Cys Asn Gly Gln Asp Arg Ser Val Leu
2975 2980 2985

Asn Ile Gly Met Glu Glu Gly Glu Tyr Pro Gly Pro Ala Val Ser
2990 2995 3000

Thr Val Thr Val Gly Glu Ala Val Gln Ser Lys Asp Val Arg Pro
3005 3010 3015

Tyr Val Leu Val Ile Gly Ser Asn Lys Ala Thr Ser Asn Arg Ala
3020 3025 3030

Lys Thr Ala Lys Asn Val Lys Leu Tyr Lys Gly Gly Asp Ala Val
3035 3040 3045

```
Glu Val  Arg Asp Leu Ile Lys  Lys Gly Glu Met Leu  Val Val Ala
    3050                 3055                 3060

Leu Ala  Asp Val Glu Gln Asp  Leu Leu Glu Tyr Val  Asp Tyr Lys
    3065                 3070                 3075

Gly Thr  Phe Leu Thr Arg Glu  Thr Leu Glu Ala Leu  Ser Leu Gly
    3080                 3085                 3090

Lys Pro  Lys Ala Lys Asn Ile  Thr Lys Ala Asp Ala  His Arg Leu
    3095                 3100                 3105

Leu Asn  Pro Glu Lys Glu Gln  Ile Gly Leu Pro Asp  Trp Phe Thr
    3110                 3115                 3120

Ala Thr  Glu Pro Ile Phe Leu  Glu Ala Met Ile Lys  Gln Glu Lys
    3125                 3130                 3135

Tyr His  Ile Thr Gly Asp Val  Ala Thr Val Lys Asp  Lys Ala Lys
    3140                 3145                 3150

Gln Leu  Gly Ala Thr Asp Ser  Thr Arg Ile Val Lys  Glu Val Gly
    3155                 3160                 3165

Ala Arg  Val Tyr Thr Met Lys  Leu Asn Ser Trp Ala  Leu Gln Ala
    3170                 3175                 3180

Glu Arg  Gly Asp Ala Asn Leu  Lys Pro Leu Phe Glu  Glu Leu Leu
    3185                 3190                 3195

Leu Gln  Cys Pro Pro Gly Arg  Thr Val Lys Gly Gly  Thr Met Val
    3200                 3205                 3210

Ser Ala  Tyr Gln Leu Ala Gln  Gly Asn Trp Thr Pro  Thr Ser Cys
    3215                 3220                 3225

Lys Val  Tyr Met Gly Thr Ile  Thr Ala Lys Arg Val  Lys Ile His
    3230                 3235                 3240

Pro Tyr  Glu Ala Tyr Ile Lys  Leu Lys Glu Leu Ile  Glu Glu Tyr
    3245                 3250                 3255

Asn Met  Lys Arg Val Thr Gly  Asp Thr Gly Leu Lys  Arg His Asn
```

3260 3265 3270

Glu Trp Ile Leu Lys Arg Ile Lys His His Gly Asn Leu Arg Thr
3275 3280 3285

Lys Lys Ile Leu Asn Pro Gly Lys Val Ala Glu Gln Leu Ser Arg
3290 3295 3300

Glu Gly His Lys His Asn Val Tyr Asn Lys Ile Ile Gly Ser Thr
3305 3310 3315

Met Ala Ser Val Gly Ile Lys Leu Glu Lys Leu Pro Val Val Arg
3320 3325 3330

Ala Gln Thr Asp Thr Thr Phe Phe His Gln Ala Ile Arg Asp Lys
3335 3340 3345

Ile Asp Lys Glu Glu Asn Pro Gln Thr Pro Asp Leu His Lys Glu
3350 3355 3360

Leu Lys Glu Val Phe Asn Ala Leu Lys Ile Pro Glu Leu Ala Ala
3365 3370 3375

Thr Tyr Asp Ala Val Glu Trp Glu Glu Leu Glu Thr Gly Ile Asn
3380 3385 3390

Arg Lys Gly Ala Ala Gly Phe Phe Glu Arg Lys Asn Ile Gly Glu
3395 3400 3405

Ile Leu Asp Thr Glu Lys Asn Lys Val Glu Asp Ile Ile Arg Asp
3410 3415 3420

Leu Lys Ser Gly Arg Pro Ile Lys Tyr Tyr Glu Thr Ala Ile Pro
3425 3430 3435

Lys Asn Glu Lys Arg Asp Val Asn Asp Asp Trp Glu Ser Gly Asp
3440 3445 3450

Phe Val Asp Glu Lys Lys Pro Arg Val Ile Gln Tyr Pro Glu Ala
3455 3460 3465

Lys Val Arg Leu Ala Ile Thr Lys Val Met Tyr Lys Trp Val Lys
3470 3475 3480

Gln Lys Pro Val Val Ile Pro Gly Tyr Glu Gly Lys Thr Pro Leu
3485 3490 3495

Phe Glu Ile Phe Asp Lys Val Lys Lys Glu Trp Gly Ser Phe Asp
3500 3505 3510

Asn Pro Val Ala Val Ser Phe Asp Thr Lys Ala Trp Asp Thr Gln
3515 3520 3525

Val Thr Ser Lys Ser Leu Glu Leu Ile Arg Asp Ile Gln Lys Tyr
3530 3535 3540

Tyr Phe Lys Lys Glu Trp His Lys Phe Ile Glu Thr Ile Thr Glu
3545 3550 3555

His Met Val Glu Val Pro Val Val Thr Ala Asp Gly Glu Val Tyr
3560 3565 3570

Ile Ser Glu Gly Gln Arg Gly Ser Gly Gln Pro Asp Thr Ser Ala
3575 3580 3585

Gly Asn Ser Met Leu Asn Val Leu Thr Met Val Tyr Ala Phe Cys
3590 3595 3600

Arg Ala Thr Gly Val Pro Tyr Lys Ser Phe Lys Arg Val Ala Lys
3605 3610 3615

Ile His Val Cys Gly Asp Asp Gly Phe Leu Ile Thr Glu Lys Ser
3620 3625 3630

Leu Gly Glu Lys Phe Ala Ser Lys Gly Ile Gln Ile Leu His Glu
3635 3640 3645

Ala Gly Lys Pro Gln Lys Ile Thr Glu Gly Asp Arg Met Lys Val
3650 3655 3660

Ala Tyr Lys Phe Glu Asp Ile Glu Phe Cys Ser His Thr Pro Val
3665 3670 3675

Pro Val Arg Trp Ser Asp Asn Thr Thr Ser Tyr Met Pro Gly Arg
3680 3685 3690

Asn Thr Ala Thr Ile Leu Ala Lys Met Ala Thr Arg Leu Asp Ser

3695 3700 3705

Ser Gly Glu Arg Gly Thr Thr Ala Tyr Glu Lys Ala Val Ala Phe
3710 3715 3720

Ser Phe Leu Leu Met Tyr Ser Trp Asn Pro Leu Val Arg Arg Ile
3725 3730 3735

Cys Leu Leu Thr Leu Ser Ser Glu Leu Gly Thr Lys Pro Ser Lys
3740 3745 3750

Arg Thr Thr Tyr Tyr Tyr Glu Gly Asp Pro Ile Ser Ala Tyr Arg
3755 3760 3765

Glu Val Ile Gly His Asn Leu Leu Asp Leu Lys Arg Thr Gly Leu
3770 3775 3780

Glu Lys Leu Ala Leu Leu Asn Leu Ser Met Ser Thr Leu Gly Ile
3785 3790 3795

Trp Thr Lys His Ile Ser Lys Arg Leu Leu Gln Asp Cys Val Asp
3800 3805 3810

Val Gly Ser Lys Asp Gly Asn Trp Leu Val Asn Ala Asp Arg Pro
3815 3820 3825

Glu Ser Arg Lys Thr Gly Lys Val Tyr Leu Gln Ser Gly Gly His
3830 3835 3840

Thr Val Arg Gly Arg His Tyr Glu Asp Leu Ile Leu Pro Arg Met
3845 3850 3855

Val Lys Pro Thr Phe Gln Gly Val Asp Arg Tyr Lys Leu Gly Pro
3860 3865 3870

Ile Val Asn Val Ile Phe Arg Arg Leu Arg Val Met Met Met Ala
3875 3880 3885

Leu Val Gly Arg Gly Met
3890

<210> 12
<211> 3895
<212> PRT

<213> BDV

<400> 12

```
Met Glu Leu Asn Lys Phe Glu Leu Leu Tyr Lys Thr Ser Lys Gln Lys
1               5                  10                  15

Pro Val Gly Val Thr Glu Pro Ile Tyr Asp Ser Ala Gly Asn Pro Ile
            20                  25                  30

Tyr Gly Glu Arg Ser Thr Ile His Pro Gln Ser Thr Leu Lys Leu Pro
        35                  40                  45

His Glu Arg Gly Val Ala Glu Val Val Thr Thr Leu Arg Asp Leu Pro
    50                  55                  60

Lys Lys Gly Asp Cys Arg Ser Gly Asn His Arg Gly Pro Val Ser Gly
65                  70                  75                  80

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

Val Tyr His Arg Ala Pro Leu Glu Leu Phe Val Glu Thr Gln Phe Cys
            100                 105                 110

Glu Val Thr Lys Arg Ile Gly Arg Val Thr Gly Ser Asp Gly Arg Leu
        115                 120                 125

Tyr His Leu Tyr Ile Cys Ser Asp Gly Cys Ile Leu Leu Lys Thr Ala
    130                 135                 140

Ser Lys Thr Arg Ser Ala Val Leu Lys Trp Thr Arg Asn Ile Leu Asp
145                 150                 155                 160

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

Thr Asn Glu Lys Lys Pro Asp Arg Val Arg Arg Gly Ala Met Lys Ile
            180                 185                 190

Thr Pro Lys Glu Ser Glu Lys Asp Ser Arg Ser Lys Pro Pro Asp Ala
        195                 200                 205

Thr Ile Val Val Glu Gly Ile Lys Tyr Gln Val Lys Lys Lys Gly Lys
    210                 215                 220
```

```
Val Lys Gly Lys Asn Thr Gln Asp Gly Leu Tyr His Asn Lys Asn Lys
225                 230                 235                 240

Pro Pro Glu Ser Arg Lys Lys Leu Glu Lys Ala Leu Leu Ala Trp Ala
                245                 250                 255

Ile Ile Ala Ile Phe Met Trp Glu Pro Val Ala Pro Glu Asn Val Thr
            260                 265                 270

Gln Trp Asn Leu Ser Asp Asn Gly Thr Thr Gly Ile Gln Leu Leu Met
        275                 280                 285

Phe Gln Arg Gly Val Asn Arg Ser Leu His Gly Ile Trp Pro Glu Lys
    290                 295                 300

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

Gly Ile Gln Gly Met Met Asp Ala Ser Glu Lys Thr Asn Tyr Thr Cys
                325                 330                 335

Cys Arg Leu Gln Arg His Glu Trp Asn Lys Tyr Gly Trp Cys Asn Trp
            340                 345                 350

Tyr Asn Ile Asn Pro Trp Ile Trp Leu Met Asn Lys Thr Gln Ala Asn
        355                 360                 365

Leu Thr Glu Gly Pro Pro Glu Lys Glu Cys Ala Val Thr Cys Arg Phe
    370                 375                 380

Asp Lys Glu Ala Asp Ile Asn Ile Val Thr Gln Ala Arg Asp Arg Pro
385                 390                 395                 400

Thr Thr Leu Thr Gly Cys Lys Lys Gly Lys Lys Phe Ser Phe Ala Gly
                405                 410                 415

Met Ile Ile Glu Gly Pro Cys Asn Phe Asn Val Ser Val Glu Asp Ile
            420                 425                 430

Leu Phe Gly Asp Asn Glu Ser Ser Ser Leu Phe Gln Asp Thr Ala Leu
        435                 440                 445
```

```
Tyr Val Val Asp Gly Val Thr Asn Thr Val Glu Asn Ala Arg Gln Gly
    450                 455                 460

Ala Ala Lys Leu Thr Ser Trp Leu Gly Lys Gln Leu Gly Ile Met Gly
465                 470                 475                 480

Lys Lys Leu Glu His Lys Ser Lys Thr Trp Phe Gly Ala Asn Ala Gln
                485                 490                 495

Ser Pro Tyr Cys Asn Val Thr Arg Lys Ile Gly Tyr Val Trp Tyr Thr
            500                 505                 510

Asn Asn Cys Thr Pro Ala Cys Leu Pro Lys Asn Thr Lys Ile Ile Gly
        515                 520                 525

Pro Gly Lys Phe Asp Thr Asn Ala Glu Asp Gly Lys Ile Leu His Glu
    530                 535                 540

Met Arg Gly His Ile Ser Glu Phe Ile Leu Leu Ser Leu Val Val Leu
545                 550                 555                 560

Ser Asp Phe Ala Pro Glu Thr Ala Ser Thr Leu Tyr Leu Val Leu His
                565                 570                 575

Phe Ala Leu Pro Gln Thr His Glu Val Pro Ser Val Cys Asp Thr Asn
            580                 585                 590

Gln Leu Asn Leu Thr Val Ser Leu Arg Val Asp Asp Val Ile Pro Ser
        595                 600                 605

Ser Val Trp Asn Leu Gly Lys Tyr Val Cys Val Arg Pro Asp Trp Trp
    610                 615                 620

Pro Tyr Glu Thr Thr Met Val Leu Leu Phe Glu Glu Ala Gly Gln Val
625                 630                 635                 640

Val Lys Leu Val Leu Arg Ala Ile Arg Asp Leu Thr Arg Val Trp Asn
                645                 650                 655

Ser Ala Ser Thr Thr Ala Phe Leu Ile Cys Leu Val Lys Val Leu Arg
            660                 665                 670

Gly Gln Val Val Gln Gly Leu Val Trp Leu Leu Leu Val Thr Gly Ala
        675                 680                 685
```

```
Gln Gly Gln Phe Ala Cys Arg Glu Asp Tyr Arg Tyr Ala Leu Ala Arg
    690                 695                 700

Thr Lys Glu Ile Gly Ala Leu Gly Ala Glu Ser Leu Thr Thr Thr Trp
705                 710                 715                 720

Thr Asp Tyr Arg Gly Asn Leu Glu Leu Asp Asp Gly Thr Val Arg Ala
                725                 730                 735

Thr Cys Ser Arg Gly Phe Phe Arg Phe Arg Gly His Cys Met Ile Gly
            740                 745                 750

Pro Arg Tyr Leu Ala Ser Leu His Leu Arg Ala Leu Pro Thr Ser Val
        755                 760                 765

Thr Phe Glu Leu Ile Pro Gly Gly Ser Ala Met Thr Glu Glu Glu Met
    770                 775                 780

Gly Asp Asp Phe Glu Phe Gly Leu Cys Pro Cys Asp Ser Arg Pro Val
785                 790                 795                 800

Val Lys Gly Lys Tyr Asn Thr Thr Leu Leu Asn Gly Ser Ala Phe Gln
                805                 810                 815

Leu Ile Cys Pro Tyr Gly Trp Val Gly Arg Val Glu Cys Thr Thr Val
            820                 825                 830

Ser Lys Ser Thr Leu Ala Thr Glu Val Val Lys Ile Tyr Lys Lys Thr
        835                 840                 845

Lys Pro Phe Pro Gln Arg Val Gly Cys Asp His Thr Thr Val Tyr Lys
    850                 855                 860

Gln Asp Leu Tyr His Cys Gln Met Gly Gly Asn Trp Thr Cys Met Arg
865                 870                 875                 880

Gly Glu Val Val Lys Tyr Val Gly Gly Pro Val Lys Lys Cys Glu Trp
                885                 890                 895

Cys Gly Tyr Val Phe Lys Lys Arg Glu Gly Leu Pro His Tyr Pro Ile
            900                 905                 910
```

```
Gly Arg Cys Met Leu Arg Asn Glu Thr Gly Tyr Arg Ser Val Asp Asp
        915                 920                 925

Thr Pro Cys Asp Arg Gly Gly Val Val Ile Ser Lys Thr Gly Glu Leu
    930                 935                 940

Glu Cys Leu Ile Gly Lys Thr Thr Val Lys Val Phe Ser Ser Asp Lys
945                 950                 955                 960

Lys Leu Gly Pro Met Pro Cys Arg Pro Lys Glu Val Ile Ser Ser Glu
                965                 970                 975

Gly Pro Val Ser Lys Ile Ala Cys Thr Phe Asn Tyr Ser Lys Thr Leu
            980                 985                 990

Glu Asn Lys Tyr Tyr Glu Pro Arg  Asp Ser Tyr Phe Gln  Gln Tyr Met
        995                 1000                1005

Leu Lys  Gly Gln Tyr Gln Tyr  Trp Phe Asp Leu Glu  Ala Thr Asp
    1010                1015                1020

His His  Ser Asp Tyr Phe Ala  Glu Phe Ile Met Leu  Ala Val Val
    1025                1030                1035

Ala Leu  Leu Gly Gly Arg Tyr  Val Leu Trp Leu Met  Val Val Tyr
    1040                1045                1050

Met Ile  Leu Ala Asp Gln Met  Thr Ser Ala Ile Asn  Leu Gly Gln
    1055                1060                1065

Gly Glu  Val Val Leu Ile Gly  Asn Leu Ile Thr His  Glu Asp His
    1070                1075                1080

Glu Val  Val Val Tyr Phe Leu  Leu Leu Tyr Leu Ile  Val Lys Asp
    1085                1090                1095

Glu Pro  Val Lys Lys Trp Ile  Leu Phe Leu Phe His  Ala Met Thr
    1100                1105                1110

Asn Asn  Pro Val Lys Thr Ile  Ser Val Gly Leu Leu  Met Leu Ser
    1115                1120                1125

Gly Leu  Val Lys Gly Glu Gly  Ala Gly Met Thr Tyr  Trp Glu Gly
    1130                1135                1140
```

```
Leu Asp  Leu Gln Phe Thr Leu  Leu Val Met Ile Thr  Ala Ser Leu
    1145                 1150                 1155

Leu Val  Ala Arg Arg Asp Val  Thr Thr Tyr Pro Leu  Ile Ile Thr
    1160                 1165                 1170

Val Ile  Ala Leu Lys Thr Thr  Trp Val Asn Ser Gly  Pro Gly Ile
    1175                 1180                 1185

Asp Ala  Ala Ile Ala Thr Ile  Thr Thr Gly Leu Leu  Met Trp Thr
    1190                 1195                 1200

Phe Ile  Ser Asp Tyr Tyr Lys  Tyr Lys Gln Trp Thr  Gln Phe Leu
    1205                 1210                 1215

Ile Ser  Ile Val Ser Gly Ile  Phe Leu Ile Arg Thr  Leu Lys Trp
    1220                 1225                 1230

Ile Gly  Gly Leu Glu Leu His  Ala Pro Glu Leu Pro  Ser Tyr Arg
    1235                 1240                 1245

Pro Leu  Phe Phe Ile Leu Thr  Tyr Leu Ile Ser Ala  Ala Ile Val
    1250                 1255                 1260

Thr Arg  Trp Asn Leu Asp Ile  Ala Gly Val Leu Leu  Gln Cys Val
    1265                 1270                 1275

Pro Thr  Ile Leu Met Val Leu  Thr Leu Trp Ala Asp  Leu Leu Thr
    1280                 1285                 1290

Leu Ile  Leu Ile Leu Pro Thr  Tyr Glu Leu Ala Lys  Leu Tyr Tyr
    1295                 1300                 1305

Leu Lys  Gly Val Lys Asn Gly  Met Glu Arg Asn Trp  Leu Gly Arg
    1310                 1315                 1320

Ile Thr  Tyr Lys Arg Val Ser  Asp Val Tyr Glu Ile  Asp Glu Ser
    1325                 1330                 1335

Gln Glu  Ala Val Tyr Leu Phe  Pro Ser Lys Gln Lys  Glu Gly Thr
    1340                 1345                 1350
```

```
Ile Thr  Gly Gly Leu Leu Pro  Leu Ile Lys Ala Ile  Leu Ile Ser
    1355                 1360                 1365

Cys Ile  Ser Ser Lys Trp Gln  Cys Phe Tyr Leu Leu  Tyr Leu Val
    1370                 1375                 1380

Val Glu  Val Ser Tyr Tyr Leu  His Lys Lys Ile Ile  Glu Glu Val
    1385                 1390                 1395

Ala Gly  Gly Thr Asn Leu Ile  Ser Arg Leu Val Ala  Ala Leu Leu
    1400                 1405                 1410

Glu Val  Asn Trp Arg Phe Asp  Asn Glu Glu Thr Lys  Gly Leu Lys
    1415                 1420                 1425

Lys Phe  Tyr Leu Ile Ser Gly  Gln Val Lys Asn Leu  Ile Ile Lys
    1430                 1435                 1440

His Lys  Val Arg Asn Glu Val  Val Ala His Trp Phe  Asn Glu Glu
    1445                 1450                 1455

Glu Val  Tyr Gly Met Pro Lys  Leu Val Ser Val Val  Lys Ala Ala
    1460                 1465                 1470

Thr Leu  Asn Arg Ser Arg His  Cys Ile Leu Cys Thr  Val Cys Glu
    1475                 1480                 1485

Ser Arg  Asp Trp Lys Gly Glu  Thr Cys Pro Lys Cys  Gly Arg Phe
    1490                 1495                 1500

Gly Pro  Ser Leu Ser Cys Gly  Met Thr Leu Ser Asp  Phe Glu Glu
    1505                 1510                 1515

Arg His  Tyr Lys Lys Ile Phe  Ile Arg Glu Asp Gln  Ser Asp Gly
    1520                 1525                 1530

Pro Phe  Arg Glu Glu Tyr Lys  Gly Tyr Leu Gln Tyr  Lys Ala Arg
    1535                 1540                 1545

Gly Gln  Leu Phe Leu Arg Asn  Leu Pro Ile Leu Ala  Thr Lys Val
    1550                 1555                 1560

Lys Leu  Leu Leu Val Gly Asn  Leu Gly Ser Glu Val  Gly Asp Leu
    1565                 1570                 1575
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Glu His  Leu Gly Trp Ile Leu  Arg Gly Pro Ala Val  Cys Lys Lys
    1580                 1585                 1590

Ile Ile  Asp His Glu Arg Cys  His Val Ser Ile Met  Asp Lys Leu
    1595                 1600                 1605

Thr Ala  Phe Phe Gly Ile Met  Pro Arg Gly Thr Thr  Pro Arg Ala
    1610                 1615                 1620

Pro Ile  Arg Phe Pro Thr Ser  Leu Leu Arg Ile Arg  Arg Gly Leu
    1625                 1630                 1635

Glu Thr  Gly Trp Ala Tyr Thr  His Gln Gly Gly Ile  Ser Ser Val
    1640                 1645                 1650

Asp His  Val Thr Ala Gly Lys  Asp Leu Leu Val Cys  Asp Ser Met
    1655                 1660                 1665

Gly Arg  Thr Arg Val Val Cys  Gln Ser Asn Asn Arg  Met Thr Asp
    1670                 1675                 1680

Glu Thr  Glu Tyr Gly Val Lys  Thr Asp Ser Gly Cys  Pro Glu Gly
    1685                 1690                 1695

Ala Arg  Cys Tyr Val Phe Asn  Pro Glu Ala Val Asn  Ile Ser Gly
    1700                 1705                 1710

Thr Lys  Gly Ala Met Val His  Leu Gln Lys Thr Gly  Gly Glu Phe
    1715                 1720                 1725

Thr Cys  Val Thr Ala Ser Gly  Thr Pro Ala Phe Phe  Asp Leu Lys
    1730                 1735                 1740

Asn Leu  Lys Gly Trp Ser Gly  Leu Pro Ile Phe Glu  Ala Ser Ser
    1745                 1750                 1755

Gly Arg  Val Val Gly Arg Val  Lys Val Gly Lys Asn  Glu Glu Ser
    1760                 1765                 1770

Lys Pro  Thr Lys Leu Met Ser  Gly Ile Gln Thr Val  Ser Lys Ser
    1775                 1780                 1785
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Thr Thr  Asp Leu Thr Asp Met  Val Lys Lys Ile Thr  Thr Met Asn
    1790                 1795                 1800

Arg Gly  Glu Phe Lys Gln Ile  Thr Leu Ala Thr Gly  Ala Gly Lys
    1805                 1810                 1815

Thr Thr  Glu Leu Pro Arg Ala  Val Ile Glu Glu Ile  Gly Arg His
    1820                 1825                 1830

Lys Arg  Val Leu Val Leu Ile  Pro Leu Arg Ala Ala  Ala Glu Ser
    1835                 1840                 1845

Val Tyr  Gln Tyr Met Arg Gln  Lys His Pro Ser Ile  Ala Phe Asn
    1850                 1855                 1860

Leu Arg  Ile Gly Glu Met Lys  Glu Gly Asp Met Ala  Thr Gly Ile
    1865                 1870                 1875

Thr Tyr  Ala Ser Tyr Gly Tyr  Phe Cys Gln Met Pro  Gln Pro Lys
    1880                 1885                 1890

Leu Arg  Ala Ala Met Val Glu  Tyr Ser Tyr Ile Phe  Leu Asp Glu
    1895                 1900                 1905

Tyr His  Cys Ala Thr Pro Glu  Gln Leu Ala Ile Ile  Gly Lys Ile
    1910                 1915                 1920

His Arg  Phe Ser Glu Gln Leu  Arg Val Val Ala Met  Thr Ala Thr
    1925                 1930                 1935

Pro Ala  Gly Thr Val Thr Thr  Thr Gly Gln Lys His  Pro Ile Glu
    1940                 1945                 1950

Glu Phe  Ile Ala Pro Glu Val  Met Lys Gly Glu Asp  Leu Gly Ser
    1955                 1960                 1965

Glu Phe  Leu Glu Ile Ala Gly  Leu Lys Ile Pro Thr  Glu Glu Met
    1970                 1975                 1980

Lys Gly  Asn Met Leu Val Phe  Val Pro Thr Arg Asn  Met Ala Val
    1985                 1990                 1995

Glu Thr  Ala Lys Lys Leu Lys  Ala Lys Gly Tyr Asn  Ser Gly Tyr
    2000                 2005                 2010
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Tyr Tyr  Ser Gly Glu Asp Pro  Ala Asn Leu Arg Val  Val Thr Ser
    2015                 2020                 2025

Gln Ser  Pro Tyr Val Val Val  Ala Thr Asn Ala Ile  Glu Ser Gly
    2030                 2035                 2040

Val Thr  Leu Pro Asp Leu Asp  Val Val Val Asp Thr  Gly Leu Lys
    2045                 2050                 2055

Cys Glu  Lys Arg Ile Arg Leu  Ser Ser Lys Met Pro  Phe Ile Val
    2060                 2065                 2070

Thr Gly  Leu Lys Arg Met Ala  Val Thr Ile Gly Glu  Gln Ala Gln
    2075                 2080                 2085

Arg Arg  Gly Arg Val Gly Arg  Val Lys Pro Gly Arg  Tyr Tyr Arg
    2090                 2095                 2100

Ser Gln  Glu Thr Ala Val Gly  Ser Lys Asp Tyr His  Tyr Asp Leu
    2105                 2110                 2115

Leu Gln  Ala Gln Arg Tyr Gly  Ile Glu Asp Gly Ile  Asn Ile Thr
    2120                 2125                 2130

Lys Ser  Phe Arg Glu Met Asn  Tyr Asp Trp Ser Leu  Tyr Glu Glu
    2135                 2140                 2145

Asp Ser  Leu Met Ile Thr Gln  Leu Glu Ile Leu Asn  Asn Leu Leu
    2150                 2155                 2160

Ile Ser  Glu Glu Leu Pro Val  Ala Val Lys Asn Ile  Met Ala Arg
    2165                 2170                 2175

Thr Asp  His Pro Glu Pro Ile  Gln Leu Ala Tyr Asn  Ser Tyr Glu
    2180                 2185                 2190

Val Gln  Val Pro Val Leu Phe  Pro Lys Ile Arg Asn  Gly Glu Val
    2195                 2200                 2205

Thr Asp  Ser Tyr Asp Ser Tyr  Ser Phe Leu Asn Ala  Arg Lys Leu
    2210                 2215                 2220
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Gly Asp  Asp Val Pro Ala Tyr  Val Tyr Ala Thr Glu  Asp Glu Asp
    2225                 2230                 2235

Leu Ala  Val Glu Leu Leu Gly  Met Asp Trp Pro Asp  Pro Gly Asn
    2240                 2245                 2250

Gln Gly  Thr Val Glu Thr Gly  Arg Ala Leu Lys Gln  Val Thr Gly
    2255                 2260                 2265

Leu Ser  Ala Ala Glu Asn Ala  Leu Leu Val Ala Leu  Phe Gly Tyr
    2270                 2275                 2280

Val Gly  Tyr Gln Ala Leu Ser  Lys Arg His Val Pro  Met Val Thr
    2285                 2290                 2295

Asp Ile  Tyr Ser Ile Glu Asp  His Arg Leu Glu Asp  Thr Thr His
    2300                 2305                 2310

Leu Gln  Phe Ala Pro Asn Ala  Ile Arg Thr Asp Gly  Lys Glu Thr
    2315                 2320                 2325

Glu Leu  Lys Glu Leu Ala Gln  Gly Asp Ile Gln Arg  Cys Ala Glu
    2330                 2335                 2340

Ala Met  Val Gly Tyr Ala Gln  Gln Gly Val Gln Phe  Ile Lys Thr
    2345                 2350                 2355

Gln Ala  Leu Lys Val Gln Glu  Asn His Val Phe Lys  Asp Ser Ala
    2360                 2365                 2370

Asp Thr  Ile Val Glu Tyr Val  Asp Lys Phe Met Lys  Ala Ile Ala
    2375                 2380                 2385

Glu Ser  Lys Asp Asp Ile Leu  Arg Tyr Gly Leu Trp  Gly Ala His
    2390                 2395                 2400

Thr Ala  Leu Tyr Lys Ser Ile  Gly Ala Arg Leu Gly  Tyr Glu Thr
    2405                 2410                 2415

Ala Phe  Ala Thr Leu Val Ile  Lys Trp Leu Ala Phe  Gly Gly Glu
    2420                 2425                 2430

Ser Ile  Asn Asp His Val Lys  Gln Ala Ala Thr Asp  Leu Val Val
    2435                 2440                 2445
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Tyr Tyr  Ile Ile Asn Arg Pro  Gln Phe Pro Gly Asp  Thr Glu Thr
    2450                 2455                 2460

Gln Gln  Glu Gly Arg Lys Phe  Val Ala Ser Leu Leu  Val Ser Ala
    2465                 2470                 2475

Leu Ala  Thr Tyr Thr Tyr Lys  Ser Trp Asn Tyr Ser  Asn Leu Ser
    2480                 2485                 2490

Lys Val  Val Glu Pro Ala Leu  Ala Cys Leu Pro Tyr  Ala Ser Gln
    2495                 2500                 2505

Ala Leu  Lys Leu Phe Ala Pro  Thr Arg Leu Glu Ser  Val Val Ile
    2510                 2515                 2520

Leu Ser  Thr Ala Ile Tyr Lys  Thr Tyr Leu Ala Ile  Arg Arg Gly
    2525                 2530                 2535

Arg Ser  Asp Gly Leu Leu Gly  Thr Gly Val Ser Ala  Ala Met Glu
    2540                 2545                 2550

Ile Met  Ser Gln Asn Pro Val  Ser Val Gly Ile Ala  Val Met Leu
    2555                 2560                 2565

Gly Val  Gly Ala Val Ala Ala  His Asn Ala Ile Glu  Ser Ser Glu
    2570                 2575                 2580

Gln Lys  Arg Thr Leu Leu Met  Lys Val Phe Val Lys  Asn Phe Leu
    2585                 2590                 2595

Asp Gln  Ala Ala Thr Asp Glu  Leu Val Lys Glu Ser  Pro Glu Lys
    2600                 2605                 2610

Ile Ile  Thr Ala Leu Phe Glu  Ala Val Gln Thr Val  Gly Asn Pro
    2615                 2620                 2625

Leu Arg  Leu Ile Tyr His Leu  Tyr Gly Val Phe Tyr  Lys Gly Trp
    2630                 2635                 2640

Glu Ala  Lys Glu Val Ala Glu  Lys Thr Ala Gly Arg  Asn Leu Phe
    2645                 2650                 2655
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Thr Leu  Ile Met Phe Glu Ala  Val Glu Leu Leu Gly  Val Asp Ser
    2660                 2665                 2670

Glu Gly  Lys Met Arg Arg Leu  Ser Gly Asn Tyr Leu  Ile Glu Leu
    2675                 2680                 2685

Leu Gln  Lys Leu His Asp Gly  Phe Arg Ile Ser Ile  Lys Lys Phe
    2690                 2695                 2700

Ala Leu  Gly Trp Ala Pro Gly  Pro Phe Ser Cys Asn  Trp Thr Pro
    2705                 2710                 2715

Ala Asp  Asn Arg Ile Arg Leu  Pro His Glu Asn Tyr  Leu Arg Val
    2720                 2725                 2730

Val Thr  Arg Cys Arg Cys Gly  Tyr Arg Thr Lys Ala  Val Lys Asn
    2735                 2740                 2745

Cys Ala  Gly Glu Leu Ile Leu  Glu Glu Glu Glu Gly  Ser Phe Phe
    2750                 2755                 2760

Cys Arg  Asn Lys Phe Gly Arg  Gly Ala Pro Asn Tyr  Lys Val Thr
    2765                 2770                 2775

Lys Phe  Tyr Asp Gly Asn Leu  Glu Glu Ile Arg Ala  Arg Leu Lys
    2780                 2785                 2790

Leu Glu  Gly Gln Val Glu Met  Tyr Tyr Lys Gly Ala  Thr Ile Lys
    2795                 2800                 2805

Ile Asp  Tyr Ser Asn Asn Lys  Leu Ile Leu Ala Thr  Asp Lys Trp
    2810                 2815                 2820

Glu Val  Glu His Ser Tyr Ile  Thr Arg Leu Thr Lys  Arg Tyr Thr
    2825                 2830                 2835

Gly Ala  Gly Tyr Lys Gly Ala  Phe Leu Gly Asp Glu  Pro Asn His
    2840                 2845                 2850

Lys Ser  Leu Ile Glu Arg Thr  Cys Ala Thr Val Cys  Lys Asp Lys
    2855                 2860                 2865

Ile Tyr  Phe Ser Lys Met Lys  Lys Gly Cys Ala Phe  Thr Tyr Asp
    2870                 2875                 2880
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Leu Ser  Leu Ser Asn Leu Val  Arg Leu Val Asp Leu  Val His Arg
    2885                 2890                 2895

Asn Lys  Leu Glu Glu Lys Asp  Ile Pro Glu Arg Thr  Val Thr Thr
    2900                 2905                 2910

Trp Leu  Ala Tyr Thr Phe Val  Asn Glu Asp Val Gly  Thr Ile Lys
    2915                 2920                 2925

Pro Val  Leu Gly Glu Lys Val  Ile Pro Glu Glu Ser  Asp Glu Ile
    2930                 2935                 2940

Asn Leu  Gln Pro Thr Val Thr  Val Asn Met Ser Lys  Cys Gln Val
    2945                 2950                 2955

Thr Val  Val Gly Glu Ala Lys  Asn Met Thr Thr Gly  Val Val Pro
    2960                 2965                 2970

Leu Thr  Val Thr Lys Glu Ala  Cys Asn Gly Gln Asp  Arg Ser Val
    2975                 2980                 2985

Leu Asn  Ile Gly Met Glu Glu  Gly Glu Tyr Pro Gly  Pro Ala Val
    2990                 2995                 3000

Ser Thr  Val Thr Val Gly Glu  Ala Val Gln Ser Lys  Asp Val Arg
    3005                 3010                 3015

Pro Tyr  Val Leu Val Ile Gly  Ser Asn Lys Ala Thr  Ser Asn Arg
    3020                 3025                 3030

Ala Lys  Thr Ala Lys Asn Val  Lys Leu Tyr Lys Gly  Gly Asp Ala
    3035                 3040                 3045

Val Glu  Val Arg Asp Leu Ile  Lys Lys Gly Glu Met  Leu Val Val
    3050                 3055                 3060

Ala Leu  Ala Asp Val Glu Gln  Asp Leu Leu Glu Tyr  Val Asp Tyr
    3065                 3070                 3075

Lys Gly  Thr Phe Leu Thr Arg  Glu Thr Leu Glu Ala  Leu Ser Leu
    3080                 3085                 3090
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Gly Lys  Pro Lys Ala Lys Asn  Ile Thr Lys Ala Asp  Ala His Arg
    3095                 3100                 3105

Leu Leu  Asn Pro Glu Lys Glu  Gln Ile Gly Leu Pro  Asp Trp Phe
    3110                 3115                 3120

Thr Ala  Thr Glu Pro Ile Phe  Leu Glu Ala Met Ile  Lys Gln Glu
    3125                 3130                 3135

Lys Tyr  His Ile Thr Gly Asp  Val Ala Thr Val Lys  Asp Lys Ala
    3140                 3145                 3150

Lys Gln  Leu Gly Ala Thr Asp  Ser Thr Arg Ile Val  Lys Glu Val
    3155                 3160                 3165

Gly Ala  Arg Val Tyr Thr Met  Lys Leu Asn Ser Trp  Ala Leu Gln
    3170                 3175                 3180

Ala Glu  Arg Gly Asp Ala Asn  Leu Lys Pro Leu Phe  Glu Glu Leu
    3185                 3190                 3195

Leu Leu  Gln Cys Pro Pro Gly  Arg Thr Val Lys Gly  Gly Thr Met
    3200                 3205                 3210

Val Ser  Ala Tyr Gln Leu Ala  Gln Gly Asn Trp Thr  Pro Thr Ser
    3215                 3220                 3225

Cys Lys  Val Tyr Met Gly Thr  Ile Thr Ala Lys Arg  Val Lys Ile
    3230                 3235                 3240

His Pro  Tyr Glu Ala Tyr Ile  Lys Leu Lys Glu Leu  Ile Glu Glu
    3245                 3250                 3255

Tyr Asn  Met Lys Arg Val Thr  Gly Asp Thr Gly Leu  Lys Arg His
    3260                 3265                 3270

Asn Glu  Trp Ile Leu Lys Arg  Ile Lys His His Gly  Asn Leu Arg
    3275                 3280                 3285

Thr Lys  Lys Ile Leu Asn Pro  Gly Lys Val Ala Glu  Gln Leu Ser
    3290                 3295                 3300

Arg Glu  Gly His Lys His Asn  Val Tyr Asn Lys Ile  Ile Gly Ser
    3305                 3310                 3315
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Thr Met  Ala Ser Val Gly Ile  Lys Leu Glu Lys Leu  Pro Val Val
    3320                 3325                 3330

Arg Ala  Gln Thr Asp Thr Thr  Phe Phe His Gln Ala  Ile Arg Asp
    3335                 3340                 3345

Lys Ile  Asp Lys Glu Glu Asn  Pro Gln Thr Pro Asp  Leu His Lys
    3350                 3355                 3360

Glu Leu  Lys Glu Val Phe Asn  Ala Leu Lys Ile Pro  Glu Leu Ala
    3365                 3370                 3375

Ala Thr  Tyr Asp Ala Val Glu  Trp Glu Glu Leu Glu  Thr Gly Ile
    3380                 3385                 3390

Asn Arg  Lys Gly Ala Ala Gly  Phe Phe Glu Arg Lys  Asn Ile Gly
    3395                 3400                 3405

Glu Ile  Leu Asp Thr Glu Lys  Asn Lys Val Glu Asp  Ile Ile Arg
    3410                 3415                 3420

Asp Leu  Lys Ser Gly Arg Pro  Ile Lys Tyr Tyr Glu  Thr Ala Ile
    3425                 3430                 3435

Pro Lys  Asn Glu Lys Arg Asp  Val Asn Asp Asp Trp  Glu Ser Gly
    3440                 3445                 3450

Asp Phe  Val Asp Glu Lys Lys  Pro Arg Val Ile Gln  Tyr Pro Glu
    3455                 3460                 3465

Ala Lys  Val Arg Leu Ala Ile  Thr Lys Val Met Tyr  Lys Trp Val
    3470                 3475                 3480

Lys Gln  Lys Pro Val Val Ile  Pro Gly Tyr Glu Gly  Lys Thr Pro
    3485                 3490                 3495

Leu Phe  Glu Ile Phe Asp Lys  Val Lys Lys Glu Trp  Gly Ser Phe
    3500                 3505                 3510

Asp Asn  Pro Val Ala Val Ser  Phe Asp Thr Lys Ala  Trp Asp Thr
    3515                 3520                 3525
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Gln Val  Thr Ser Lys Ser Leu  Glu Leu Ile Arg Asp  Ile Gln Lys
    3530                 3535                 3540

Tyr Tyr  Phe Lys Lys Glu Trp  His Lys Phe Ile Glu  Thr Ile Thr
    3545                 3550                 3555

Glu His  Met Val Glu Val Pro  Val Val Thr Ala Asp  Gly Glu Val
    3560                 3565                 3570

Tyr Ile  Ser Glu Gly Gln Arg  Gly Ser Gly Gln Pro  Asp Thr Ser
    3575                 3580                 3585

Ala Gly  Asn Ser Met Leu Asn  Val Leu Thr Met Val  Tyr Ala Phe
    3590                 3595                 3600

Cys Arg  Ala Thr Gly Val Pro  Tyr Lys Ser Phe Lys  Arg Val Ala
    3605                 3610                 3615

Lys Ile  His Val Cys Gly Asp  Asp Gly Phe Leu Ile  Thr Glu Lys
    3620                 3625                 3630

Ser Leu  Gly Glu Lys Phe Ala  Ser Lys Gly Ile Gln  Ile Leu His
    3635                 3640                 3645

Glu Ala  Gly Lys Pro Gln Lys  Ile Thr Glu Gly Asp  Arg Met Lys
    3650                 3655                 3660

Val Ala  Tyr Lys Phe Glu Asp  Ile Glu Phe Cys Ser  His Thr Pro
    3665                 3670                 3675

Val Pro  Val Arg Trp Ser Asp  Asn Thr Thr Ser Tyr  Met Pro Gly
    3680                 3685                 3690

Arg Asn  Thr Ala Thr Ile Leu  Ala Lys Met Ala Thr  Arg Leu Asp
    3695                 3700                 3705

Ser Ser  Gly Glu Arg Gly Thr  Thr Ala Tyr Glu Lys  Ala Val Ala
    3710                 3715                 3720

Phe Ser  Phe Leu Leu Met Tyr  Ser Trp Asn Pro Leu  Val Arg Arg
    3725                 3730                 3735

Ile Cys  Leu Leu Thr Leu Ser  Ser Glu Leu Gly Thr  Lys Pro Ser
    3740                 3745                 3750
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Lys Arg  Thr Thr Tyr Tyr Tyr  Glu Gly Asp Pro Ile  Ser Ala Tyr
    3755                 3760                 3765

Arg Glu  Val Ile Gly His Asn  Leu Leu Asp Leu Lys  Arg Thr Gly
    3770                 3775                 3780

Leu Glu  Lys Leu Ala Leu Leu  Asn Leu Ser Met Ser  Thr Leu Gly
    3785                 3790                 3795

Ile Trp  Thr Lys His Ile Ser  Lys Arg Leu Leu Gln  Asp Cys Val
    3800                 3805                 3810

Asp Val  Gly Ser Lys Asp Gly  Asn Trp Leu Val Asn  Ala Asp Arg
    3815                 3820                 3825

Pro Glu  Ser Arg Lys Thr Gly  Lys Val Tyr Leu Gln  Ser Gly Gly
    3830                 3835                 3840

His Thr  Val Arg Gly Arg His  Tyr Glu Asp Leu Ile  Leu Pro Arg
    3845                 3850                 3855

Met Val  Lys Pro Thr Phe Gln  Gly Val Asp Arg Tyr  Lys Leu Gly
    3860                 3865                 3870

Pro Ile  Val Asn Val Ile Phe  Arg Arg Leu Arg Val  Met Met Met
    3875                 3880                 3885

Ala Leu  Val Gly Arg Gly Met
    3890                 3895
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