SEQUENCE LISTING

<110> Tryggvason, Karl
Sergey, Rodin

<120> Cell Culture Medium

<130> LCTI-200006WO02

<160> 8

<170> PatentIn version 3.5

<210> 1
<211> 3695
<212> PRT
<213> Homo sapiens

<400> 1

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Arg Gly Pro Ala Pro Leu Leu Leu Val Gly Leu Ala Leu Leu Gly Ala
            20                  25                  30

Ala Arg Ala Arg Glu Glu Ala Gly Gly Gly Phe Ser Leu His Pro Pro
        35                  40                  45

Tyr Phe Asn Leu Ala Glu Gly Ala Arg Ile Ala Ala Ser Ala Thr Cys
    50                  55                  60

Gly Glu Glu Ala Pro Ala Arg Gly Ser Pro Arg Pro Thr Glu Asp Leu
65                  70                  75                  80

Tyr Cys Lys Leu Val Gly Gly Pro Val Ala Gly Gly Asp Pro Asn Gln
                85                  90                  95

Thr Ile Arg Gly Gln Tyr Cys Asp Ile Cys Thr Ala Ala Asn Ser Asn
            100                 105                 110

Lys Ala His Pro Ala Ser Asn Ala Ile Asp Gly Thr Glu Arg Trp Trp
        115                 120                 125

Gln Ser Pro Pro Leu Ser Arg Gly Leu Glu Tyr Asn Glu Val Asn Val
    130                 135                 140

Thr Leu Asp Leu Gly Gln Val Phe His Val Ala Tyr Val Leu Ile Lys
145                 150                 155                 160

Phe Ala Asn Ser Pro Arg Pro Asp Leu Trp Val Leu Glu Arg Ser Met
                165                 170                 175
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Asp Phe Gly Arg Thr Tyr Gln Pro Trp Gln Phe Phe Ala Ser Ser Lys
            180                 185                 190

Arg Asp Cys Leu Glu Arg Phe Gly Pro Gln Thr Leu Glu Arg Ile Thr
        195                 200                 205

Arg Asp Asp Ala Ala Ile Cys Thr Thr Glu Tyr Ser Arg Ile Val Pro
    210                 215                 220

Leu Glu Asn Gly Glu Ile Val Val Ser Leu Val Asn Gly Arg Pro Gly
225                 230                 235                 240

Ala Met Asn Phe Ser Tyr Ser Pro Leu Leu Arg Glu Phe Thr Lys Ala
                245                 250                 255

Thr Asn Val Arg Leu Arg Phe Leu Arg Thr Asn Thr Leu Leu Gly His
            260                 265                 270

Leu Met Gly Lys Ala Leu Arg Asp Pro Thr Val Thr Arg Arg Tyr Tyr
        275                 280                 285

Tyr Ser Ile Lys Asp Ile Ser Ile Gly Gly Arg Cys Val Cys His Gly
    290                 295                 300

His Ala Asp Ala Cys Asp Ala Lys Asp Pro Thr Asp Pro Phe Arg Leu
305                 310                 315                 320

Gln Cys Thr Cys Gln His Asn Thr Cys Gly Gly Thr Cys Asp Arg Cys
                325                 330                 335

Cys Pro Gly Phe Asn Gln Gln Pro Trp Lys Pro Ala Thr Ala Asn Ser
            340                 345                 350

Ala Asn Glu Cys Gln Ser Cys Asn Cys Tyr Gly His Ala Thr Asp Cys
        355                 360                 365

Tyr Tyr Asp Pro Glu Val Asp Arg Arg Arg Ala Ser Gln Ser Leu Asp
    370                 375                 380

Gly Thr Tyr Gln Gly Gly Gly Val Cys Ile Asp Cys Gln His His Thr
385                 390                 395                 400

Thr Gly Val Asn Cys Glu Arg Cys Leu Pro Gly Phe Tyr Arg Ser Pro
                405                 410                 415

Asn His Pro Leu Asp Ser Pro His Val Cys Arg Arg Cys Asn Cys Glu
            420                 425                 430
```

Ser Asp Phe Thr Asp Gly Thr Cys Glu Asp Leu Thr Gly Arg Cys Tyr
435 440 445

Cys Arg Pro Asn Phe Ser Gly Glu Arg Cys Asp Val Cys Ala Glu Gly
450 455 460

Phe Thr Gly Phe Pro Ser Cys Tyr Pro Thr Pro Ser Ser Ser Asn Asp
465 470 475 480

Thr Arg Glu Gln Val Leu Pro Ala Gly Gln Ile Val Asn Cys Asp Cys
485 490 495

Ser Ala Ala Gly Thr Gln Gly Asn Ala Cys Arg Lys Asp Pro Arg Val
500 505 510

Gly Arg Cys Leu Cys Lys Pro Asn Phe Gln Gly Thr His Cys Glu Leu
515 520 525

Cys Ala Pro Gly Phe Tyr Gly Pro Gly Cys Gln Pro Cys Gln Cys Ser
530 535 540

Ser Pro Gly Val Ala Asp Asp Arg Cys Asp Pro Asp Thr Gly Gln Cys
545 550 555 560

Arg Cys Arg Val Gly Phe Glu Gly Ala Thr Cys Asp Arg Cys Ala Pro
565 570 575

Gly Tyr Phe His Phe Pro Leu Cys Gln Leu Cys Gly Cys Ser Pro Ala
580 585 590

Gly Thr Leu Pro Glu Gly Cys Asp Glu Ala Gly Arg Cys Leu Cys Gln
595 600 605

Pro Glu Phe Ala Gly Pro His Cys Asp Arg Cys Arg Pro Gly Tyr His
610 615 620

Gly Phe Pro Asn Cys Gln Ala Cys Thr Cys Asp Pro Arg Gly Ala Leu
625 630 635 640

Asp Gln Leu Cys Gly Ala Gly Gly Leu Cys Arg Cys Arg Pro Gly Tyr
645 650 655

Thr Gly Thr Ala Cys Gln Glu Cys Ser Pro Gly Phe His Gly Phe Pro
660 665 670

Ser Cys Val Pro Cys His Cys Ser Ala Glu Gly Ser Leu His Ala Ala

675 680 685

Cys Asp Pro Arg Ser Gly Gln Cys Ser Cys Arg Pro Arg Val Thr Gly
690 695 700

Leu Arg Cys Asp Thr Cys Val Pro Gly Ala Tyr Asn Phe Pro Tyr Cys
705 710 715 720

Glu Ala Gly Ser Cys His Pro Ala Gly Leu Ala Pro Val Asp Pro Ala
725 730 735

Leu Pro Glu Ala Gln Val Pro Cys Met Cys Arg Ala His Val Glu Gly
740 745 750

Pro Ser Cys Asp Arg Cys Lys Pro Gly Phe Trp Gly Leu Ser Pro Ser
755 760 765

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

Gly Gly Val Ala Glu Cys Gln Pro Gly Thr Gly Gln Cys Phe Cys Lys
785 790 795 800

Pro His Val Cys Gly Gln Ala Cys Ala Ser Cys Lys Asp Gly Phe Phe
805 810 815

Gly Leu Asp Gln Ala Asp Tyr Phe Gly Cys Arg Ser Cys Arg Cys Asp
820 825 830

Ile Gly Gly Ala Leu Gly Gln Ser Cys Glu Pro Arg Thr Gly Val Cys
835 840 845

Arg Cys Arg Pro Asn Thr Gln Gly Pro Thr Cys Ser Glu Pro Ala Arg
850 855 860

Asp His Tyr Leu Pro Asp Leu His His Leu Arg Leu Glu Leu Glu Glu
865 870 875 880

Ala Ala Thr Pro Glu Gly His Ala Val Arg Phe Gly Phe Asn Pro Leu
885 890 895

Glu Phe Glu Asn Phe Ser Trp Arg Gly Tyr Ala Gln Met Ala Pro Val
900 905 910

Gln Pro Arg Ile Val Ala Arg Leu Asn Leu Thr Ser Pro Asp Leu Phe
915 920 925

```
Trp Leu Val Phe Arg Tyr Val Asn Arg Gly Ala Met Ser Val Ser Gly
    930                 935                 940

Arg Val Ser Val Arg Glu Glu Gly Arg Ser Ala Thr Cys Ala Asn Cys
945                 950                 955                 960

Thr Ala Gln Ser Gln Pro Val Ala Phe Pro Pro Ser Thr Glu Pro Ala
                965                 970                 975

Phe Ile Thr Val Pro Gln Arg Gly Phe Gly Glu Pro Phe Val Leu Asn
            980                 985                 990

Pro Gly Thr Trp Ala Leu Arg Val  Glu Ala Glu Gly Val  Leu Leu Asp
        995                 1000                1005

Tyr Val  Val Leu Leu Pro Ser  Ala Tyr Tyr Glu Ala  Ala Leu Leu
    1010                1015                1020

Gln Leu  Arg Val Thr Glu Ala  Cys Thr Tyr Arg Pro  Ser Ala Gln
    1025                1030                1035

Gln Ser  Gly Asp Asn Cys Leu  Leu Tyr Thr His Leu  Pro Leu Asp
    1040                1045                1050

Gly Phe  Pro Ser Ala Ala Gly  Leu Glu Ala Leu Cys  Arg Gln Asp
    1055                1060                1065

Asn Ser  Leu Pro Arg Pro Cys  Pro Thr Glu Gln Leu  Ser Pro Ser
    1070                1075                1080

His Pro  Pro Leu Ile Thr Cys  Thr Gly Ser Asp Val  Asp Val Gln
    1085                1090                1095

Leu Gln  Val Ala Val Pro Gln  Pro Gly Arg Tyr Ala  Leu Val Val
    1100                1105                1110

Glu Tyr  Ala Asn Glu Asp Ala  Arg Gln Glu Val Gly  Val Ala Val
    1115                1120                1125

His Thr  Pro Gln Arg Ala Pro  Gln Gln Gly Leu Leu  Ser Leu His
    1130                1135                1140

Pro Cys  Leu Tyr Ser Thr Leu  Cys Arg Gly Thr Ala  Arg Asp Thr
    1145                1150                1155

Gln Asp  His Leu Ala Val Phe  His Leu Asp Ser Glu  Ala Ser Val
    1160                1165                1170
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Arg Leu Thr Ala Glu Gln Ala Arg Phe Phe Leu His Gly Val Thr
    1175                1180                1185

Leu Val Pro Ile Glu Glu Phe Ser Pro Glu Phe Val Glu Pro Arg
    1190                1195                1200

Val Ser Cys Ile Ser Ser His Gly Ala Phe Gly Pro Asn Ser Ala
    1205                1210                1215

Ala Cys Leu Pro Ser Arg Phe Pro Lys Pro Pro Gln Pro Ile Ile
    1220                1225                1230

Leu Arg Asp Cys Gln Val Ile Pro Leu Pro Pro Gly Leu Pro Leu
    1235                1240                1245

Thr His Ala Gln Asp Leu Thr Pro Ala Met Ser Pro Ala Gly Pro
    1250                1255                1260

Arg Pro Arg Pro Pro Thr Ala Val Asp Pro Asp Ala Glu Pro Thr
    1265                1270                1275

Leu Leu Arg Glu Pro Gln Ala Thr Val Val Phe Thr Thr His Val
    1280                1285                1290

Pro Thr Leu Gly Arg Tyr Ala Phe Leu Leu His Gly Tyr Gln Pro
    1295                1300                1305

Ala His Pro Thr Phe Pro Val Glu Val Leu Ile Asn Ala Gly Arg
    1310                1315                1320

Val Trp Gln Gly His Ala Asn Ala Ser Phe Cys Pro His Gly Tyr
    1325                1330                1335

Gly Cys Arg Thr Leu Val Val Cys Glu Gly Gln Ala Leu Leu Asp
    1340                1345                1350

Val Thr His Ser Glu Leu Thr Val Thr Val Arg Val Pro Lys Gly
    1355                1360                1365

Arg Trp Leu Trp Leu Asp Tyr Val Leu Val Val Pro Glu Asn Val
    1370                1375                1380

Tyr Ser Phe Gly Tyr Leu Arg Glu Glu Pro Leu Asp Lys Ser Tyr
    1385                1390                1395

Asp Phe Ile Ser His Cys Ala Ala Gln Gly Tyr His Ile Ser Pro
    1400                1405                1410
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Ser Ser Ser Ser Leu Phe Cys Arg Asn Ala Ala Ala Ser Leu Ser
1415 1420 1425

Leu Phe Tyr Asn Asn Gly Ala Arg Pro Cys Gly Cys His Glu Val
1430 1435 1440

Gly Ala Thr Gly Pro Thr Cys Glu Pro Phe Gly Gly Gln Cys Pro
1445 1450 1455

Cys His Ala His Val Ile Gly Arg Asp Cys Ser Arg Cys Ala Thr
1460 1465 1470

Gly Tyr Trp Gly Phe Pro Asn Cys Arg Pro Cys Asp Cys Gly Ala
1475 1480 1485

Arg Leu Cys Asp Glu Leu Thr Gly Gln Cys Ile Cys Pro Pro Arg
1490 1495 1500

Thr Ile Pro Pro Asp Cys Leu Leu Cys Gln Pro Gln Thr Phe Gly
1505 1510 1515

Cys His Pro Leu Val Gly Cys Glu Glu Cys Asn Cys Ser Gly Pro
1520 1525 1530

Gly Ile Gln Glu Leu Thr Asp Pro Thr Cys Asp Thr Asp Ser Gly
1535 1540 1545

Gln Cys Lys Cys Arg Pro Asn Val Thr Gly Arg Arg Cys Asp Thr
1550 1555 1560

Cys Ser Pro Gly Phe His Gly Tyr Pro Arg Cys Arg Pro Cys Asp
1565 1570 1575

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

Gly Gln Cys Tyr Cys Lys Glu Asn Val Gln Gly Pro Lys Cys Asp
1595 1600 1605

Gln Cys Ser Leu Gly Thr Phe Ser Leu Asp Ala Ala Asn Pro Lys
1610 1615 1620

Gly Cys Thr Arg Cys Phe Cys Phe Gly Ala Thr Glu Arg Cys Arg
1625 1630 1635

Ser Ser Ser Tyr Thr Arg Gln Glu Phe Val Asp Met Glu Gly Trp

1640 1645 1650

Val Leu Leu Ser Thr Asp Arg Gln Val Val Pro His Glu Arg Gln
1655 1660 1665

Pro Gly Thr Glu Met Leu Arg Ala Asp Leu Arg His Val Pro Glu
1670 1675 1680

Ala Val Pro Glu Ala Phe Pro Glu Leu Tyr Trp Gln Ala Pro Pro
1685 1690 1695

Ser Tyr Leu Gly Asp Arg Val Ser Ser Tyr Gly Gly Thr Leu Arg
1700 1705 1710

Tyr Glu Leu His Ser Glu Thr Gln Arg Gly Asp Val Phe Val Pro
1715 1720 1725

Met Glu Ser Arg Pro Asp Val Val Leu Gln Gly Asn Gln Met Ser
1730 1735 1740

Ile Thr Phe Leu Glu Pro Ala Tyr Pro Thr Pro Gly His Val His
1745 1750 1755

Arg Gly Gln Leu Gln Leu Val Glu Gly Asn Phe Arg His Thr Glu
1760 1765 1770

Thr Arg Asn Thr Val Ser Arg Glu Glu Leu Met Met Val Leu Ala
1775 1780 1785

Ser Leu Glu Gln Leu Gln Ile Arg Ala Leu Phe Ser Gln Ile Ser
1790 1795 1800

Ser Ala Val Phe Leu Arg Arg Val Ala Leu Glu Val Ala Ser Pro
1805 1810 1815

Ala Gly Gln Gly Ala Leu Ala Ser Asn Val Glu Leu Cys Leu Cys
1820 1825 1830

Pro Ala Ser Tyr Arg Gly Asp Ser Cys Gln Glu Cys Ala Pro Gly
1835 1840 1845

Phe Tyr Arg Asp Val Lys Gly Leu Phe Leu Gly Arg Cys Val Pro
1850 1855 1860

Cys Gln Cys His Gly His Ser Asp Arg Cys Leu Pro Gly Ser Gly
1865 1870 1875

Val Cys Val Asp Cys Gln His Asn Thr Glu Gly Ala His Cys Glu
1880 1885 1890

Arg Cys Gln Ala Gly Phe Val Ser Ser Arg Asp Asp Pro Ser Ala
1895 1900 1905

Pro Cys Val Ser Cys Pro Cys Pro Leu Ser Val Pro Ser Asn Asn
1910 1915 1920

Phe Ala Glu Gly Cys Val Leu Arg Gly Gly Arg Thr Gln Cys Leu
1925 1930 1935

Cys Lys Pro Gly Tyr Ala Gly Ala Ser Cys Glu Arg Cys Ala Pro
1940 1945 1950

Gly Phe Phe Gly Asn Pro Leu Val Leu Gly Ser Ser Cys Gln Pro
1955 1960 1965

Cys Asp Cys Ser Gly Asn Gly Asp Pro Asn Leu Leu Phe Ser Asp
1970 1975 1980

Cys Asp Pro Leu Thr Gly Ala Cys Arg Gly Cys Leu Arg His Thr
1985 1990 1995

Thr Gly Pro Arg Cys Glu Ile Cys Ala Pro Gly Phe Tyr Gly Asn
2000 2005 2010

Ala Leu Leu Pro Gly Asn Cys Thr Arg Cys Asp Cys Thr Pro Cys
2015 2020 2025

Gly Thr Glu Ala Cys Asp Pro His Ser Gly His Cys Leu Cys Lys
2030 2035 2040

Ala Gly Val Thr Gly Arg Arg Cys Asp Arg Cys Gln Glu Gly His
2045 2050 2055

Phe Gly Phe Asp Gly Cys Gly Gly Cys Arg Pro Cys Ala Cys Gly
2060 2065 2070

Pro Ala Ala Glu Gly Ser Glu Cys His Pro Gln Ser Gly Gln Cys
2075 2080 2085

His Cys Arg Pro Gly Thr Met Gly Pro Gln Cys Arg Glu Cys Ala
2090 2095 2100

Pro Gly Tyr Trp Gly Leu Pro Glu Gln Gly Cys Arg Arg Cys Gln
2105 2110 2115

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Cys Pro  Gly Gly Arg Cys Asp  Pro His Thr Gly Arg  Cys Asn Cys
    2120                 2125                 2130

Pro Pro  Gly Leu Ser Gly Glu  Arg Cys Asp Thr Cys  Ser Gln Gln
    2135                 2140                 2145

His Gln  Val Pro Val Pro Gly  Gly Pro Val Gly His  Ser Ile His
    2150                 2155                 2160

Cys Glu  Val Cys Asp His Cys  Val Val Leu Leu Leu  Asp Asp Leu
    2165                 2170                 2175

Glu Arg  Ala Gly Ala Leu Leu  Pro Ala Ile His Glu  Gln Leu Arg
    2180                 2185                 2190

Gly Ile  Asn Ala Ser Ser Met  Ala Trp Ala Arg Leu  His Arg Leu
    2195                 2200                 2205

Asn Ala  Ser Ile Ala Asp Leu  Gln Ser Gln Leu Arg  Ser Pro Leu
    2210                 2215                 2220

Gly Pro  Arg His Glu Thr Ala  Gln Gln Leu Glu Val  Leu Glu Gln
    2225                 2230                 2235

Gln Ser  Thr Ser Leu Gly Gln  Asp Ala Arg Arg Leu  Gly Gly Gln
    2240                 2245                 2250

Ala Val  Gly Thr Arg Asp Gln  Ala Ser Gln Leu Leu  Ala Gly Thr
    2255                 2260                 2265

Glu Ala  Thr Leu Gly His Ala  Lys Thr Leu Leu Ala  Ala Ile Arg
    2270                 2275                 2280

Ala Val  Asp Arg Thr Leu Ser  Glu Leu Met Ser Gln  Thr Gly His
    2285                 2290                 2295

Leu Gly  Leu Ala Asn Ala Ser  Ala Pro Ser Gly Glu  Gln Leu Leu
    2300                 2305                 2310

Arg Thr  Leu Ala Glu Val Glu  Arg Leu Leu Trp Glu  Met Arg Ala
    2315                 2320                 2325

Arg Asp  Leu Gly Ala Pro Gln  Ala Ala Ala Glu Ala  Glu Leu Ala
    2330                 2335                 2340

Ala Ala  Gln Arg Leu Leu Ala  Arg Val Gln Glu Gln  Leu Ser Ser
    2345                 2350                 2355
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Leu Trp  Glu Glu Asn Gln Ala  Leu Ala Thr Gln Thr  Arg Asp Arg
    2360                 2365                 2370

Leu Ala  Gln His Glu Ala Gly  Leu Met Asp Leu Arg  Glu Ala Leu
    2375                 2380                 2385

Asn Arg  Ala Val Asp Ala Thr  Arg Glu Ala Gln Glu  Leu Asn Ser
    2390                 2395                 2400

Arg Asn  Gln Glu Arg Leu Glu  Glu Ala Leu Gln Arg  Lys Gln Glu
    2405                 2410                 2415

Leu Ser  Arg Asp Asn Ala Thr  Leu Gln Ala Thr Leu  His Ala Ala
    2420                 2425                 2430

Arg Asp  Thr Leu Ala Ser Val  Phe Arg Leu Leu His  Ser Leu Asp
    2435                 2440                 2445

Gln Ala  Lys Glu Glu Leu Glu  Arg Leu Ala Ala Ser  Leu Asp Gly
    2450                 2455                 2460

Ala Arg  Thr Pro Leu Leu Gln  Arg Met Gln Thr Phe  Ser Pro Ala
    2465                 2470                 2475

Gly Ser  Lys Leu Arg Leu Val  Glu Ala Ala Glu Ala  His Ala Gln
    2480                 2485                 2490

Gln Leu  Gly Gln Leu Ala Leu  Asn Leu Ser Ser Ile  Ile Leu Asp
    2495                 2500                 2505

Val Asn  Gln Asp Arg Leu Thr  Gln Arg Ala Ile Glu  Ala Ser Asn
    2510                 2515                 2520

Ala Tyr  Ser Arg Ile Leu Gln  Ala Val Gln Ala Ala  Glu Asp Ala
    2525                 2530                 2535

Ala Gly  Gln Ala Leu Gln Gln  Ala Asp His Thr Trp  Ala Thr Val
    2540                 2545                 2550

Val Arg  Gln Gly Leu Val Asp  Arg Ala Gln Gln Leu  Leu Ala Asn
    2555                 2560                 2565

Ser Thr  Ala Leu Glu Glu Ala  Met Leu Gln Glu Gln  Gln Arg Leu
    2570                 2575                 2580

Gly Leu  Val Trp Ala Ala Leu  Gln Gly Ala Arg Thr  Gln Leu Arg
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2585 2590 2595

Asp Val Arg Ala Lys Lys Asp Gln Leu Glu Ala His Ile Gln Ala
2600 2605 2610

Ala Gln Ala Met Leu Ala Met Asp Thr Asp Glu Thr Ser Lys Lys
2615 2620 2625

Ile Ala His Ala Lys Ala Val Ala Ala Glu Ala Gln Asp Thr Ala
2630 2635 2640

Thr Arg Val Gln Ser Gln Leu Gln Ala Met Gln Glu Asn Val Glu
2645 2650 2655

Arg Trp Gln Gly Gln Tyr Glu Gly Leu Arg Gly Gln Asp Leu Gly
2660 2665 2670

Gln Ala Val Leu Asp Ala Gly His Ser Val Ser Thr Leu Glu Lys
2675 2680 2685

Thr Leu Pro Gln Leu Leu Ala Lys Leu Ser Ile Leu Glu Asn Arg
2690 2695 2700

Gly Val His Asn Ala Ser Leu Ala Leu Ser Ala Ser Ile Gly Arg
2705 2710 2715

Val Arg Glu Leu Ile Ala Gln Ala Arg Gly Ala Ala Ser Lys Val
2720 2725 2730

Lys Val Pro Met Lys Phe Asn Gly Arg Ser Gly Val Gln Leu Arg
2735 2740 2745

Thr Pro Arg Asp Leu Ala Asp Leu Ala Ala Tyr Thr Ala Leu Lys
2750 2755 2760

Phe Tyr Leu Gln Gly Pro Glu Pro Glu Pro Gly Gln Gly Thr Glu
2765 2770 2775

Asp Arg Phe Val Met Tyr Met Gly Ser Arg Gln Ala Thr Gly Asp
2780 2785 2790

Tyr Met Gly Val Ser Leu Arg Asp Lys Lys Val His Trp Val Tyr
2795 2800 2805

Gln Leu Gly Glu Ala Gly Pro Ala Val Leu Ser Ile Asp Glu Asp
2810 2815 2820

Ile Gly Glu Gln Phe Ala Ala Val Ser Leu Asp Arg Thr Leu Gln
2825 2830 2835

Phe Gly His Met Ser Val Thr Val Glu Arg Gln Met Ile Gln Glu
2840 2845 2850

Thr Lys Gly Asp Thr Val Ala Pro Gly Ala Glu Gly Leu Leu Asn
2855 2860 2865

Leu Arg Pro Asp Asp Phe Val Phe Tyr Val Gly Gly Tyr Pro Ser
2870 2875 2880

Thr Phe Thr Pro Pro Pro Leu Leu Arg Phe Pro Gly Tyr Arg Gly
2885 2890 2895

Cys Ile Glu Met Asp Thr Leu Asn Glu Glu Val Val Ser Leu Tyr
2900 2905 2910

Asn Phe Glu Arg Thr Phe Gln Leu Asp Thr Ala Val Asp Arg Pro
2915 2920 2925

Cys Ala Arg Ser Lys Ser Thr Gly Asp Pro Trp Leu Thr Asp Gly
2930 2935 2940

Ser Tyr Leu Asp Gly Thr Gly Phe Ala Arg Ile Ser Phe Asp Ser
2945 2950 2955

Gln Ile Ser Thr Thr Lys Arg Phe Glu Gln Glu Leu Arg Leu Val
2960 2965 2970

Ser Tyr Ser Gly Val Leu Phe Phe Leu Lys Gln Gln Ser Gln Phe
2975 2980 2985

Leu Cys Leu Ala Val Gln Glu Gly Ser Leu Val Leu Leu Tyr Asp
2990 2995 3000

Phe Gly Ala Gly Leu Lys Lys Ala Val Pro Leu Gln Pro Pro Pro
3005 3010 3015

Pro Leu Thr Ser Ala Ser Lys Ala Ile Gln Val Phe Leu Leu Gly
3020 3025 3030

Gly Ser Arg Lys Arg Val Leu Val Arg Val Glu Arg Ala Thr Val
3035 3040 3045

Tyr Ser Val Glu Gln Asp Asn Asp Leu Glu Leu Ala Asp Ala Tyr
3050 3055 3060

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Tyr Leu Gly Gly Val Pro Pro Asp Gln Leu Pro Pro Ser Leu Arg
    3065                3070                3075

Arg Leu Phe Pro Thr Gly Gly Ser Val Arg Gly Cys Val Lys Gly
    3080                3085                3090

Ile Lys Ala Leu Gly Lys Tyr Val Asp Leu Lys Arg Leu Asn Thr
    3095                3100                3105

Thr Gly Val Ser Ala Gly Cys Thr Ala Asp Leu Leu Val Gly Arg
    3110                3115                3120

Ala Met Thr Phe His Gly His Gly Phe Leu Arg Leu Ala Leu Ser
    3125                3130                3135

Asn Val Ala Pro Leu Thr Gly Asn Val Tyr Ser Gly Phe Gly Phe
    3140                3145                3150

His Ser Ala Gln Asp Ser Ala Leu Leu Tyr Tyr Arg Ala Ser Pro
    3155                3160                3165

Asp Gly Leu Cys Gln Val Ser Leu Gln Gln Gly Arg Val Ser Leu
    3170                3175                3180

Gln Leu Leu Arg Thr Glu Val Lys Thr Gln Ala Gly Phe Ala Asp
    3185                3190                3195

Gly Ala Pro His Tyr Val Ala Phe Tyr Ser Asn Ala Thr Gly Val
    3200                3205                3210

Trp Leu Tyr Val Asp Asp Gln Leu Gln Gln Met Lys Pro His Arg
    3215                3220                3225

Gly Pro Pro Pro Glu Leu Gln Pro Gln Pro Glu Gly Pro Pro Arg
    3230                3235                3240

Leu Leu Leu Gly Gly Leu Pro Glu Ser Gly Thr Ile Tyr Asn Phe
    3245                3250                3255

Ser Gly Cys Ile Ser Asn Val Phe Val Gln Arg Leu Leu Gly Pro
    3260                3265                3270

Gln Arg Val Phe Asp Leu Gln Gln Asn Leu Gly Ser Val Asn Val
    3275                3280                3285

Ser Thr Gly Cys Ala Pro Ala Leu Gln Ala Gln Thr Pro Gly Leu
    3290                3295                3300
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Gly Pro Arg Gly Leu Gln Ala Thr Ala Arg Lys Ala Ser Arg Arg
3305 3310 3315

Ser Arg Gln Pro Ala Arg His Pro Ala Cys Met Leu Pro Pro His
3320 3325 3330

Leu Arg Thr Thr Arg Asp Ser Tyr Gln Phe Gly Gly Ser Leu Ser
3335 3340 3345

Ser His Leu Glu Phe Val Gly Ile Leu Ala Arg His Arg Asn Trp
3350 3355 3360

Pro Ser Leu Ser Met His Val Leu Pro Arg Ser Ser Arg Gly Leu
3365 3370 3375

Leu Leu Phe Thr Ala Arg Leu Arg Pro Gly Ser Pro Ser Leu Ala
3380 3385 3390

Leu Phe Leu Ser Asn Gly His Phe Val Ala Gln Met Glu Gly Leu
3395 3400 3405

Gly Thr Arg Leu Arg Ala Gln Ser Arg Gln Arg Ser Arg Pro Gly
3410 3415 3420

Arg Trp His Lys Val Ser Val Arg Trp Glu Lys Asn Arg Ile Leu
3425 3430 3435

Leu Val Thr Asp Gly Ala Arg Ala Trp Ser Gln Glu Gly Pro His
3440 3445 3450

Arg Gln His Gln Gly Ala Glu His Pro Gln Pro His Thr Leu Phe
3455 3460 3465

Val Gly Gly Leu Pro Ala Ser Ser His Ser Ser Lys Leu Pro Val
3470 3475 3480

Thr Val Gly Phe Ser Gly Cys Val Lys Arg Leu Arg Leu His Gly
3485 3490 3495

Arg Pro Leu Gly Ala Pro Thr Arg Met Ala Gly Val Thr Pro Cys
3500 3505 3510

Ile Leu Gly Pro Leu Glu Ala Gly Leu Phe Phe Pro Gly Ser Gly
3515 3520 3525

Gly Val Ile Thr Leu Asp Leu Pro Gly Ala Thr Leu Pro Asp Val

3530 3535 3540

Gly Leu Glu Leu Glu Val Arg Pro Leu Ala Val Thr Gly Leu Ile
3545 3550 3555

Phe His Leu Gly Gln Ala Arg Thr Pro Pro Tyr Leu Gln Leu Gln
3560 3565 3570

Val Thr Glu Lys Gln Val Leu Leu Arg Ala Asp Asp Gly Ala Gly
3575 3580 3585

Glu Phe Ser Thr Ser Val Thr Arg Pro Ser Val Leu Cys Asp Gly
3590 3595 3600

Gln Trp His Arg Leu Ala Val Met Lys Ser Gly Asn Val Leu Arg
3605 3610 3615

Leu Glu Val Asp Ala Gln Ser Asn His Thr Val Gly Pro Leu Leu
3620 3625 3630

Ala Ala Ala Ala Gly Ala Pro Ala Pro Leu Tyr Leu Gly Gly Leu
3635 3640 3645

Pro Glu Pro Met Ala Val Gln Pro Trp Pro Pro Ala Tyr Cys Gly
3650 3655 3660

Cys Met Arg Arg Leu Ala Val Asn Arg Ser Pro Val Ala Met Thr
3665 3670 3675

Arg Ser Val Glu Val His Gly Ala Val Gly Ala Ser Gly Cys Pro
3680 3685 3690

Ala Ala
3695

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Met Glu Leu Thr Ser Arg Glu Arg Gly Arg Gly Gln Pro Leu Pro Trp
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Glu Leu Arg Leu Gly Leu Leu Leu Ser Val Leu Ala Ala Thr Leu Ala
20 25 30

Gln Ala Pro Ala Pro Asp Val Pro Gly Cys Ser Arg Gly Ser Cys Tyr

35 40 45

Pro Ala Thr Gly Asp Leu Leu Val Gly Arg Ala Asp Arg Leu Thr Ala
50 55 60

Ser Ser Thr Cys Gly Leu Asn Gly Pro Gln Pro Tyr Cys Ile Val Ser
65 70 75 80

His Leu Gln Asp Glu Lys Lys Cys Phe Leu Cys Asp Ser Arg Arg Pro
85 90 95

Phe Ser Ala Arg Asp Asn Pro His Ser His Arg Ile Gln Asn Val Val
100 105 110

Thr Ser Phe Ala Pro Gln Arg Arg Ala Ala Trp Trp Gln Ser Glu Asn
115 120 125

Gly Ile Pro Ala Val Thr Ile Gln Leu Asp Leu Glu Ala Glu Phe His
130 135 140

Phe Thr His Leu Ile Met Thr Phe Lys Thr Phe Arg Pro Ala Ala Met
145 150 155 160

Leu Val Glu Arg Ser Ala Asp Phe Gly Arg Thr Trp His Val Tyr Arg
165 170 175

Tyr Phe Ser Tyr Asp Cys Gly Ala Asp Phe Pro Gly Val Pro Leu Ala
180 185 190

Pro Pro Arg His Trp Asp Asp Val Val Cys Glu Ser Arg Tyr Ser Glu
195 200 205

Ile Glu Pro Ser Thr Glu Gly Glu Val Ile Tyr Arg Val Leu Asp Pro
210 215 220

Ala Ile Pro Ile Pro Asp Pro Tyr Ser Ser Arg Ile Gln Asn Leu Leu
225 230 235 240

Lys Ile Thr Asn Leu Arg Val Asn Leu Thr Arg Leu His Thr Leu Gly
245 250 255

Asp Asn Leu Leu Asp Pro Arg Arg Glu Ile Arg Glu Lys Tyr Tyr Tyr
260 265 270

Ala Leu Tyr Glu Leu Val Val Arg Gly Asn Cys Phe Cys Tyr Gly His
275 280 285

```
Ala Ser Glu Cys Ala Pro Ala Pro Gly Ala Pro Ala His Ala Glu Gly
    290                 295                 300

Met Val His Gly Ala Cys Ile Cys Lys His Asn Thr Arg Gly Leu Asn
305                 310                 315                 320

Cys Glu Gln Cys Gln Asp Phe Tyr Arg Asp Leu Pro Trp Arg Pro Ala
                325                 330                 335

Glu Asp Gly His Ser His Ala Cys Arg Lys Cys Glu Cys His Gly His
            340                 345                 350

Thr His Ser Cys His Phe Asp Met Ala Val Tyr Leu Ala Ser Gly Asn
        355                 360                 365

Val Ser Gly Gly Val Cys Asp Gly Cys Gln His Asn Thr Ala Gly Arg
    370                 375                 380

His Cys Glu Leu Cys Arg Pro Phe Phe Tyr Arg Asp Pro Thr Lys Asp
385                 390                 395                 400

Leu Arg Asp Pro Ala Val Cys Arg Ser Cys Asp Cys Asp Pro Met Gly
                405                 410                 415

Ser Gln Asp Gly Gly Arg Cys Asp Ser His Asp Asp Pro Ala Leu Gly
            420                 425                 430

Leu Val Ser Gly Gln Cys Arg Cys Lys Glu His Val Val Gly Thr Arg
        435                 440                 445

Cys Gln Gln Cys Arg Asp Gly Phe Phe Gly Leu Ser Ile Ser Asp Arg
    450                 455                 460

Leu Gly Cys Arg Arg Cys Gln Cys Asn Ala Arg Gly Thr Val Pro Gly
465                 470                 475                 480

Ser Thr Pro Cys Asp Pro Asn Ser Gly Ser Cys Tyr Cys Lys Arg Leu
                485                 490                 495

Val Thr Gly Arg Gly Cys Asp Arg Cys Leu Pro Gly His Trp Gly Leu
            500                 505                 510

Ser His Asp Leu Leu Gly Cys Arg Pro Cys Asp Cys Asp Val Gly Gly
        515                 520                 525

Ala Leu Asp Pro Gln Cys Asp Glu Gly Thr Gly Gln Cys His Cys Arg
    530                 535                 540
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Gln His Met Val Gly Arg Arg Cys Glu Gln Val Gln Pro Gly Tyr Phe
545                 550                 555                 560

Arg Pro Phe Leu Asp His Leu Ile Trp Glu Ala Glu Asp Thr Arg Gly
                565                 570                 575

Gln Val Leu Asp Val Val Glu Arg Leu Val Thr Pro Gly Glu Thr Pro
            580                 585                 590

Ser Trp Thr Gly Ser Gly Phe Val Arg Leu Gln Glu Gly Gln Thr Leu
        595                 600                 605

Glu Phe Leu Val Ala Ser Val Pro Lys Ala Met Asp Tyr Asp Leu Leu
    610                 615                 620

Leu Arg Leu Glu Pro Gln Val Pro Glu Gln Trp Ala Glu Leu Glu Leu
625                 630                 635                 640

Ile Val Gln Arg Pro Gly Pro Val Pro Ala His Ser Leu Cys Gly His
                645                 650                 655

Leu Val Pro Lys Asp Asp Arg Ile Gln Gly Thr Leu Gln Pro His Ala
            660                 665                 670

Arg Tyr Leu Ile Phe Pro Asn Pro Val Cys Leu Glu Pro Gly Ile Ser
        675                 680                 685

Tyr Lys Leu His Leu Lys Leu Val Arg Thr Gly Gly Ser Ala Gln Pro
    690                 695                 700

Glu Thr Pro Tyr Ser Gly Pro Gly Leu Leu Ile Asp Ser Leu Val Leu
705                 710                 715                 720

Leu Pro Arg Val Leu Val Leu Glu Met Phe Ser Gly Gly Asp Ala Ala
                725                 730                 735

Ala Leu Glu Arg Gln Ala Thr Phe Glu Arg Tyr Gln Cys His Glu Glu
            740                 745                 750

Gly Leu Val Pro Ser Lys Thr Ser Pro Ser Glu Ala Cys Ala Pro Leu
        755                 760                 765

Leu Ile Ser Leu Ser Thr Leu Ile Tyr Asn Gly Ala Leu Pro Cys Gln
    770                 775                 780

Cys Asn Pro Gln Gly Ser Leu Ser Ser Glu Cys Asn Pro His Gly Gly
785                 790                 795                 800
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Gln Cys Leu Cys Lys Pro Gly Val Val Gly Arg Arg Cys Asp Leu Cys
                805                 810                 815

Ala Pro Gly Tyr Tyr Gly Phe Gly Pro Thr Gly Cys Gln Ala Cys Gln
            820                 825                 830

Cys Ser His Glu Gly Ala Leu Ser Ser Leu Cys Glu Lys Thr Ser Gly
        835                 840                 845

Gln Cys Leu Cys Arg Thr Gly Ala Phe Gly Leu Arg Cys Asp Arg Cys
    850                 855                 860

Gln Arg Gly Gln Trp Gly Phe Pro Ser Cys Arg Pro Cys Val Cys Asn
865                 870                 875                 880

Gly His Ala Asp Glu Cys Asn Thr His Thr Gly Ala Cys Leu Gly Cys
                885                 890                 895

Arg Asp His Thr Gly Gly Glu His Cys Glu Arg Cys Ile Ala Gly Phe
            900                 905                 910

His Gly Asp Pro Arg Leu Pro Tyr Gly Gly Gln Cys Arg Pro Cys Pro
        915                 920                 925

Cys Pro Glu Gly Pro Gly Ser Gln Arg His Phe Ala Thr Ser Cys His
    930                 935                 940

Gln Asp Glu Tyr Ser Gln Gln Ile Val Cys His Cys Arg Ala Gly Tyr
945                 950                 955                 960

Thr Gly Leu Arg Cys Glu Ala Cys Ala Pro Gly His Phe Gly Asp Pro
                965                 970                 975

Ser Arg Pro Gly Gly Arg Cys Gln Leu Cys Glu Cys Ser Gly Asn Ile
            980                 985                 990

Asp Pro Met Asp Pro Asp Ala Cys  Asp Pro His Thr Gly  Gln Cys Leu
        995                 1000                1005

Arg Cys  Leu His His Thr Glu  Gly Pro His Cys Ala  His Cys Lys
    1010                1015                1020

Pro Gly  Phe His Gly Gln Ala  Ala Arg Gln Ser Cys  His Arg Cys
    1025                1030                1035

Thr Cys  Asn Leu Leu Gly Thr  Asn Pro Gln Gln Cys  Pro Ser Pro
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```
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Asp Gln Cys His Cys Asp Pro Ser Ser Gly Gln Cys Pro Cys Leu
1055                1060                1065

Pro Asn Val Gln Gly Pro Ser Cys Asp Arg Cys Ala Pro Asn Phe
1070                1075                1080

Trp Asn Leu Thr Ser Gly His Gly Cys Gln Pro Cys Ala Cys His
1085                1090                1095

Pro Ser Arg Ala Arg Gly Pro Thr Cys Asn Glu Phe Thr Gly Gln
1100                1105                1110

Cys His Cys Arg Ala Gly Phe Gly Gly Arg Thr Cys Ser Glu Cys
1115                1120                1125

Gln Glu Leu His Trp Gly Asp Pro Gly Leu Gln Cys His Ala Cys
1130                1135                1140

Asp Cys Asp Ser Arg Gly Ile Asp Thr Pro Gln Cys His Arg Phe
1145                1150                1155

Thr Gly His Cys Ser Cys Arg Pro Gly Val Ser Gly Val Arg Cys
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Asp Gln Cys Ala Arg Gly Phe Ser Gly Ile Phe Pro Ala Cys His
1175                1180                1185

Pro Cys His Ala Cys Phe Gly Asp Trp Asp Arg Val Val Gln Asp
1190                1195                1200

Leu Ala Ala Arg Thr Gln Arg Leu Glu Gln Arg Ala Gln Glu Leu
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Gln Gln Thr Gly Val Leu Gly Ala Phe Glu Ser Ser Phe Trp His
1220                1225                1230

Met Gln Glu Lys Leu Gly Ile Val Gln Gly Ile Val Gly Ala Arg
1235                1240                1245

Asn Thr Ser Ala Ala Ser Thr Ala Gln Leu Val Glu Ala Thr Glu
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Glu Leu Arg Arg Glu Ile Gly Glu Ala Thr Glu His Leu Thr Gln
1265                1270                1275
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Asn His Ala Leu Ser Gly Leu Glu Arg Asp Arg Leu Ala Leu Asn
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Leu Thr Leu Arg Gln Leu Asp Gln His Leu Asp Leu Leu Lys His
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Ser Asn Phe Leu Gly Ala Tyr Asp Ser Ile Arg His Ala His Ser
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Gln Ser Ala Glu Ala Glu Arg Arg Ala Asn Thr Ser Ala Leu Ala
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Val Pro Ser Pro Val Ser Asn Ser Ala Ser Ala Arg His Arg Thr
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Glu Ala Leu Met Asp Ala Gln Lys Glu Asp Phe Asn Ser Lys His
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Met Ala Asn Gln Arg Ala Leu Gly Lys Leu Ser Ala His Thr His
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Thr Leu Ser Leu Thr Asp Ile Asn Glu Leu Val Cys Gly Ala Pro
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Gly Asp Ala Pro Cys Ala Thr Ser Pro Cys Gly Gly Ala Gly Cys
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Arg Asp Glu Asp Gly Gln Pro Arg Cys Gly Gly Leu Ser Cys Asn
1430 1435 1440

Gly Ala Ala Ala Thr Ala Asp Leu Ala Leu Gly Arg Ala Arg His
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Thr Gln Ala Glu Leu Gln Arg Ala Leu Ala Glu Gly Gly Ser Ile
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Leu Ser Arg Val Ala Glu Thr Arg Arg Gln Ala Ser Glu Ala Gln
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Gln Arg Ala Gln Ala Ala Leu Asp Lys Ala Asn Ala Ser Arg Gly
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Gln Val Glu Gln Ala Asn Gln Glu Leu Gln Glu Leu Ile Gln Ser
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Val Lys Asp Phe Leu Asn Gln Glu Gly Ala Asp Pro Asp Ser Ile
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Glu Met Val Ala Thr Arg Val Leu Glu Leu Ser Ile Pro Ala Ser
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Ala Glu Gln Ile Gln His Leu Ala Gly Ala Ile Ala Glu Arg Val
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Arg Ser Leu Ala Asp Val Asp Ala Ile Leu Ala Arg Thr Val Gly
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Asp Val Arg Arg Ala Glu Gln Leu Leu Gln Asp Ala Arg Arg Ala
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Arg Ser Trp Ala Glu Asp Glu Lys Gln Lys Ala Glu Thr Val Gln
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Ala Ala Leu Glu Glu Ala Gln Arg Ala Gln Gly Ile Ala Gln Gly
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Ala Ile Arg Gly Ala Val Ala Asp Thr Arg Asp Thr Glu Gln Thr
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Leu Tyr Gln Val Gln Glu Arg Met Ala Gly Ala Glu Arg Ala Leu
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Ser Ser Ala Gly Glu Arg Ala Arg Gln Leu Asp Ala Leu Leu Glu
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Ala Leu Lys Leu Lys Arg Ala Gly Asn Ser Leu Ala Ala Ser Thr
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Ala Glu Glu Thr Ala Gly Ser Ala Gln Gly Arg Ala Gln Glu Ala
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Glu Gln Leu Leu Arg Gly Pro Leu Gly Asp Gln Tyr Gln Thr Val
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Lys Ala Leu Ala Glu Arg Lys Ala Gln Gly Val Leu Ala Ala Gln
1715 1720 1725

Ala Arg Ala Glu Gln Leu Arg Asp Glu Ala Arg Asp Leu Leu Gln
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Ala Ala Gln Asp Lys Leu Gln Arg Leu Gln Glu Leu Glu Gly Thr
1745 1750 1755

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Tyr Glu  Glu Asn Glu Arg Ala  Leu Glu Ser Lys Ala  Ala Gln Leu
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Asp Gly  Leu Glu Ala Arg Met  Arg Ser Val Leu Gln  Ala Ile Asn
    1775                 1780                 1785

Leu Gln  Val Gln Ile Tyr Asn  Thr Cys Gln Lys Ser  Ser Trp Pro
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Gly Arg  Ala Pro Asn Lys Pro  Val
    1805                 1810
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            20                  25                  30

Ala Gln Ala Ala Met Asp Glu Cys Thr Asp Glu Gly Gly Arg Pro Gln
        35                  40                  45

Arg Cys Met Pro Glu Phe Val Asn Ala Ala Phe Asn Val Thr Val Val
    50                  55                  60

Ala Thr Asn Thr Cys Gly Thr Pro Pro Glu Glu Tyr Cys Val Gln Thr
65                  70                  75                  80

Gly Val Thr Gly Val Thr Lys Ser Cys His Leu Cys Asp Ala Gly Gln
                85                  90                  95

Pro His Leu Gln His Gly Ala Ala Phe Leu Thr Asp Tyr Asn Asn Gln
            100                 105                 110

Ala Asp Thr Thr Trp Trp Gln Ser Gln Thr Met Leu Ala Gly Val Gln
        115                 120                 125

Tyr Pro Ser Ser Ile Asn Leu Thr Leu His Leu Gly Lys Ala Phe Asp
    130                 135                 140

Ile Thr Tyr Val Arg Leu Lys Phe His Thr Ser Arg Pro Glu Ser Phe
145                 150                 155                 160
```

```
Ala Ile Tyr Lys Arg Thr Arg Glu Asp Gly Pro Trp Ile Pro Tyr Gln
                165                 170                 175

Tyr Tyr Ser Gly Ser Cys Glu Asn Thr Tyr Ser Lys Ala Asn Arg Gly
            180                 185                 190

Phe Ile Arg Thr Gly Gly Asp Glu Gln Gln Ala Leu Cys Thr Asp Glu
        195                 200                 205

Phe Ser Asp Ile Ser Pro Leu Thr Gly Gly Asn Val Ala Phe Ser Thr
    210                 215                 220

Leu Glu Gly Arg Pro Ser Ala Tyr Asn Phe Asp Asn Ser Pro Val Leu
225                 230                 235                 240

Gln Glu Trp Val Thr Ala Thr Asp Ile Arg Val Thr Leu Asn Arg Leu
                245                 250                 255

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

Asn Gly His Ala Ser Glu Cys Met Lys Asn Glu Phe Asp Lys Leu Val
    290                 295                 300

Cys Asn Cys Lys His Asn Thr Tyr Gly Val Asp Cys Glu Lys Cys Leu
305                 310                 315                 320

Pro Phe Phe Asn Asp Arg Pro Trp Arg Arg Ala Thr Ala Glu Ser Ala
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Ser Glu Cys Leu Pro Cys Asp Cys Asn Gly Arg Ser Gln Glu Cys Tyr
            340                 345                 350

Phe Asp Pro Glu Leu Tyr Arg Ser Thr Gly His Gly Gly His Cys Thr
        355                 360                 365

Asn Cys Gln Asp Asn Thr Asp Gly Ala His Cys Glu Arg Cys Arg Glu
    370                 375                 380

Asn Phe Phe Arg Leu Gly Asn Asn Glu Ala Cys Ser Ser Cys His Cys
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Ser Pro Val Gly Ser Leu Ser Thr Gln Cys Asp Ser Tyr Gly Arg Cys
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Ser Cys Lys Pro Gly Val Met Gly Asp Lys Cys Asp Arg Cys Gln Pro
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Gly Phe His Ser Leu Thr Glu Ala Gly Cys Arg Pro Cys Ser Cys Asp
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Pro Ser Gly Ser Ile Asp Glu Cys Asn Ile Glu Thr Gly Arg Cys Val
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Cys Lys Asp Asn Val Glu Gly Phe Asn Cys Glu Arg Cys Lys Pro Gly
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Phe Phe Asn Leu Glu Ser Ser Asn Pro Arg Gly Cys Thr Pro Cys Phe
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Cys Phe Gly His Ser Ser Val Cys Thr Asn Ala Val Gly Tyr Ser Val
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Tyr Ser Ile Ser Ser Thr Phe Gln Ile Asp Glu Asp Gly Trp Arg Ala
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Glu Gln Arg Asp Gly Ser Glu Ala Ser Leu Glu Trp Ser Ser Glu Arg
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Gln Asp Ile Ala Val Ile Ser Asp Ser Tyr Phe Pro Arg Tyr Phe Ile
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Ala Pro Ala Lys Phe Leu Gly Lys Gln Val Leu Ser Tyr Gly Gln Asn
565 570 575

Leu Ser Phe Ser Phe Arg Val Asp Arg Arg Asp Thr Arg Leu Ser Ala
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Glu Asp Leu Val Leu Glu Gly Ala Gly Leu Arg Val Ser Val Pro Leu
595 600 605

Ile Ala Gln Gly Asn Ser Tyr Pro Ser Glu Thr Thr Val Lys Tyr Val
610 615 620

Phe Arg Leu His Glu Ala Thr Asp Tyr Pro Trp Arg Pro Ala Leu Thr
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Pro Phe Glu Phe Gln Lys Leu Leu Asn Asn Leu Thr Ser Ile Lys Ile
645 650 655

```
Arg Gly Thr Tyr Ser Glu Arg Ser Ala Gly Tyr Leu Asp Asp Val Thr
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Leu Ala Ser Ala Arg Pro Gly Pro Gly Val Pro Ala Thr Trp Val Glu
        675                 680                 685

Ser Cys Thr Cys Pro Val Gly Tyr Gly Gly Gln Phe Cys Glu Met Cys
    690                 695                 700

Leu Ser Gly Tyr Arg Arg Glu Thr Pro Asn Leu Gly Pro Tyr Ser Pro
705                 710                 715                 720

Cys Val Leu Cys Ala Cys Asn Gly His Ser Glu Thr Cys Asp Pro Glu
                725                 730                 735

Thr Gly Val Cys Asn Cys Arg Asp Asn Thr Ala Gly Pro His Cys Glu
            740                 745                 750

Lys Cys Ser Asp Gly Tyr Tyr Gly Asp Ser Thr Ala Gly Thr Ser Ser
        755                 760                 765

Asp Cys Gln Pro Cys Pro Cys Pro Gly Gly Ser Ser Cys Ala Val Val
    770                 775                 780

Pro Lys Thr Lys Glu Val Val Cys Thr Asn Cys Pro Thr Gly Thr Thr
785                 790                 795                 800

Gly Lys Arg Cys Glu Leu Cys Asp Asp Gly Tyr Phe Gly Asp Pro Leu
                805                 810                 815

Gly Arg Asn Gly Pro Val Arg Leu Cys Arg Leu Cys Gln Cys Ser Asp
            820                 825                 830

Asn Ile Asp Pro Asn Ala Val Gly Asn Cys Asn Arg Leu Thr Gly Glu
        835                 840                 845

Cys Leu Lys Cys Ile Tyr Asn Thr Ala Gly Phe Tyr Cys Asp Arg Cys
    850                 855                 860

Lys Asp Gly Phe Phe Gly Asn Pro Leu Ala Pro Asn Pro Ala Asp Lys
865                 870                 875                 880

Cys Lys Ala Cys Asn Cys Asn Leu Tyr Gly Thr Met Lys Gln Gln Ser
                885                 890                 895

Ser Cys Asn Pro Val Thr Gly Gln Cys Glu Cys Leu Pro His Val Thr
            900                 905                 910
```

```
Gly Gln Asp Cys Gly Ala Cys Asp Pro Gly Phe Tyr Asn Leu Gln Ser
        915                 920                 925

Gly Gln Gly Cys Glu Arg Cys Asp Cys His Ala Leu Gly Ser Thr Asn
    930                 935                 940

Gly Gln Cys Asp Ile Arg Thr Gly Gln Cys Glu Cys Gln Pro Gly Ile
945                 950                 955                 960

Thr Gly Gln His Cys Glu Arg Cys Glu Val Asn His Phe Gly Phe Gly
                965                 970                 975

Pro Glu Gly Cys Lys Pro Cys Asp Cys His Pro Glu Gly Ser Leu Ser
            980                 985                 990

Leu Gln Cys Lys Asp Asp Gly Arg  Cys Glu Cys Arg Glu  Gly Phe Val
        995                 1000                1005

Gly Asn  Arg Cys Asp Gln Cys  Glu Glu Asn Tyr Phe  Tyr Asn Arg
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Ser Trp  Pro Gly Cys Gln Glu  Cys Pro Ala Cys Tyr  Arg Leu Val
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Lys Asp  Lys Val Ala Asp His  Arg Val Lys Leu Gln  Glu Leu Glu
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Ser Leu  Ile Ala Asn Leu Gly  Thr Gly Asp Glu Met  Val Thr Asp
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Gln Ala  Phe Glu Asp Arg Leu  Lys Glu Ala Glu Arg  Glu Val Met
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Asp Leu  Leu Arg Glu Ala Gln  Asp Val Lys Asp Val  Asp Gln Asn
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Leu Met  Asp Arg Leu Gln Arg  Val Asn Asn Thr Leu  Ser Ser Gln
    1100                1105                1110

Ile Ser  Arg Leu Gln Asn Ile  Arg Asn Thr Ile Glu  Glu Thr Gly
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Asn Leu  Ala Glu Gln Ala Arg  Ala His Val Glu Asn  Thr Glu Arg
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Leu Ile  Glu Ile Ala Ser Arg  Glu Leu Glu Lys Ala  Lys Val Ala
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Asn Asn  Met Thr Leu Leu Ala  Glu Glu Ala Arg Lys  Leu Ala Glu
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Arg His  Lys Gln Glu Ala Asp  Asp Ile Val Arg Val  Ala Lys Thr
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Ala Asn  Asp Thr Ser Thr Glu  Ala Tyr Asn Leu Leu  Leu Arg Thr
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Leu Ala  Gly Glu Asn Gln Thr  Ala Phe Glu Ile Glu  Glu Leu Asn
    1220                 1225                 1230

Arg Lys  Tyr Glu Gln Ala Lys  Asn Ile Ser Gln Asp  Leu Glu Lys
    1235                 1240                 1245

Gln Ala  Ala Arg Val His Glu  Glu Ala Lys Arg Ala  Gly Asp Lys
    1250                 1255                 1260

Ala Val  Glu Ile Tyr Ala Ser  Val Ala Gln Leu Ser  Pro Leu Asp
    1265                 1270                 1275

Ser Glu  Thr Leu Glu Asn Glu  Ala Asn Asn Ile Lys  Met Glu Ala
    1280                 1285                 1290

Glu Asn  Leu Glu Gln Leu Ile  Asp Gln Lys Leu Lys  Asp Tyr Glu
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Asp Leu  Arg Glu Asp Met Arg  Gly Lys Glu Leu Glu  Val Lys Asn
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Leu Leu  Glu Lys Gly Lys Thr  Glu Gln Gln Thr Ala  Asp Gln Leu
    1325                 1330                 1335

Leu Ala  Arg Ala Asp Ala Ala  Lys Ala Leu Ala Glu  Glu Ala Ala
    1340                 1345                 1350

Lys Lys  Gly Arg Asp Thr Leu  Gln Glu Ala Asn Asp  Ile Leu Asn
    1355                 1360                 1365

Asn Leu  Lys Asp Phe Asp Arg  Arg Val Asn Asp Asn  Lys Thr Ala
    1370                 1375                 1380

Ala Glu  Glu Ala Leu Arg Lys  Ile Pro Ala Ile Asn  Gln Thr Ile
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Ser Ala Ala Ala Asp Ala Thr Glu Ala Lys Asn Lys Ala His Glu
1415 1420 1425

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

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