SEQUENCE LISTING

<110> GlaxoSmithKline Biologicals S.A

<120> Immunogenic composition

<130> VB65340

<160> 37

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 2710
<212> PRT
<213> clostridium difficile

<400> 1

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Arg Pro Arg Glu Asn Glu Tyr Lys Thr Ile Leu Thr Asn Leu Asp Glu
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Tyr Asn Lys Leu Thr Thr Asn Asn Asn Glu Asn Lys Tyr Leu Gln Leu
        35                  40                  45
Lys Lys Leu Asn Glu Ser Ile Asp Val Phe Met Asn Lys Tyr Lys Thr
    50                  55                  60
Ser Ser Arg Asn Arg Ala Leu Ser Asn Leu Lys Lys Asp Ile Leu Lys
65                  70                  75                  80
Glu Val Ile Leu Ile Lys Asn Ser Asn Thr Ser Pro Val Glu Lys Asn
                85                  90                  95
Leu His Phe Val Trp Ile Gly Gly Glu Val Ser Asp Ile Ala Leu Glu
            100                 105                 110
Tyr Ile Lys Gln Trp Ala Asp Ile Asn Ala Glu Tyr Asn Ile Lys Leu
        115                 120                 125
Trp Tyr Asp Ser Glu Ala Phe Leu Val Asn Thr Leu Lys Lys Ala Ile
    130                 135                 140
Val Glu Ser Ser Thr Thr Glu Ala Leu Gln Leu Leu Glu Glu Glu Ile
145                 150                 155                 160
Gln Asn Pro Gln Phe Asp Asn Met Lys Phe Tyr Lys Lys Arg Met Glu
                165                 170                 175
Phe Ile Tyr Asp Arg Gln Lys Arg Phe Ile Asn Tyr Tyr Lys Ser Gln
            180                 185                 190
Ile Asn Lys Pro Thr Val Pro Thr Ile Asp Asp Ile Ile Lys Ser His
        195                 200                 205
Leu Val Ser Glu Tyr Asn Arg Asp Glu Thr Val Leu Glu Ser Tyr Arg
    210                 215                 220
Thr Asn Ser Leu Arg Lys Ile Asn Ser Asn His Gly Ile Asp Ile Arg
225                 230                 235                 240
Ala Asn Ser Leu Phe Thr Glu Gln Glu Leu Leu Asn Ile Tyr Ser Gln
                245                 250                 255
Glu Leu Leu Asn Arg Gly Asn Leu Ala Ala Ala Ser Asp Ile Val Arg
            260                 265                 270
Leu Leu Ala Leu Lys Asn Phe Gly Gly Val Tyr Leu Asp Val Asp Met
        275                 280                 285
Leu Pro Gly Ile His Ser Asp Leu Phe Lys Thr Ile Ser Arg Pro Ser
    290                 295                 300
Ser Ile Gly Leu Asp Arg Trp Glu Met Ile Lys Leu Glu Ala Ile Met
305                 310                 315                 320
Lys Tyr Lys Lys Tyr Ile Asn Asn Tyr Thr Ser Glu Asn Phe Asp Lys
                325                 330                 335
Leu Asp Gln Gln Leu Lys Asp Asn Phe Lys Leu Ile Ile Glu Ser Lys
            340                 345                 350
Ser Glu Lys Ser Glu Ile Phe Ser Lys Leu Glu Asn Leu Asn Val Ser
        355                 360                 365
Asp Leu Glu Ile Lys Ile Ala Phe Ala Leu Gly Ser Val Ile Asn Gln
    370                 375                 380
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Ala Leu Ile Ser Lys Gln Gly Ser Tyr Leu Thr Asn Leu Val Ile Glu
385                 390                 395                 400
Gln Val Lys Asn Arg Tyr Gln Phe Leu Asn Gln His Leu Asn Pro Ala
                405                 410                 415
Ile Glu Ser Asp Asn Asn Phe Thr Asp Thr Thr Lys Ile Phe His Asp
            420                 425                 430
Ser Leu Phe Asn Ser Ala Thr Ala Glu Asn Ser Met Phe Leu Thr Lys
        435                 440                 445
Ile Ala Pro Tyr Leu Gln Val Gly Phe Met Pro Glu Ala Arg Ser Thr
    450                 455                 460
Ile Ser Leu Ser Gly Pro Gly Ala Tyr Ala Ser Ala Tyr Tyr Asp Phe
465                 470                 475                 480
Ile Asn Leu Gln Glu Asn Thr Ile Glu Lys Thr Leu Lys Ala Ser Asp
                485                 490                 495
Leu Ile Glu Phe Lys Phe Pro Glu Asn Asn Leu Ser Gln Leu Thr Glu
            500                 505                 510
Gln Glu Ile Asn Ser Leu Trp Ser Phe Asp Gln Ala Ser Ala Lys Tyr
        515                 520                 525
Gln Phe Glu Lys Tyr Val Arg Asp Tyr Thr Gly Gly Ser Leu Ser Glu
    530                 535                 540
Asp Asn Gly Val Asp Phe Asn Lys Asn Thr Ala Leu Asp Lys Asn Tyr
545                 550                 555                 560
Leu Leu Asn Asn Lys Ile Pro Ser Asn Asn Val Glu Glu Ala Gly Ser
                565                 570                 575
Lys Asn Tyr Val His Tyr Ile Ile Gln Leu Gln Gly Asp Asp Ile Ser
            580                 585                 590
Tyr Glu Ala Thr Cys Asn Leu Phe Ser Lys Asn Pro Lys Asn Ser Ile
        595                 600                 605
Ile Ile Gln Arg Asn Met Asn Glu Ser Ala Lys Ser Tyr Phe Leu Ser
    610                 615                 620
Asp Asp Gly Glu Ser Ile Leu Glu Leu Asn Lys Tyr Arg Ile Pro Glu
625                 630                 635                 640
Arg Leu Lys Asn Lys Glu Lys Val Lys Val Thr Phe Ile Gly His Gly
                645                 650                 655
Lys Asp Glu Phe Asn Thr Ser Glu Phe Ala Arg Leu Ser Val Asp Ser
            660                 665                 670
Leu Ser Asn Glu Ile Ser Ser Phe Leu Asp Thr Ile Lys Leu Asp Ile
        675                 680                 685
Ser Pro Lys Asn Val Glu Val Asn Leu Leu Gly Cys Asn Met Phe Ser
    690                 695                 700
Tyr Asp Phe Asn Val Glu Glu Thr Tyr Pro Gly Lys Leu Leu Leu Ser
705                 710                 715                 720
Ile Met Asp Lys Ile Thr Ser Thr Leu Pro Asp Val Asn Lys Asn Ser
                725                 730                 735
Ile Thr Ile Gly Ala Asn Gln Tyr Glu Val Arg Ile Asn Ser Glu Gly
            740                 745                 750
Arg Lys Glu Leu Leu Ala His Ser Gly Lys Trp Ile Asn Lys Glu Glu
        755                 760                 765
Ala Ile Met Ser Asp Leu Ser Ser Lys Glu Tyr Ile Phe Phe Asp Ser
    770                 775                 780
Ile Asp Asn Lys Leu Lys Ala Lys Ser Lys Asn Ile Pro Gly Leu Ala
785                 790                 795                 800
Ser Ile Ser Glu Asp Ile Lys Thr Leu Leu Leu Asp Ala Ser Val Ser
                805                 810                 815
Pro Asp Thr Lys Phe Ile Leu Asn Asn Leu Lys Leu Asn Ile Glu Ser
            820                 825                 830
Ser Ile Gly Asp Tyr Ile Tyr Tyr Glu Lys Leu Glu Pro Val Lys Asn
        835                 840                 845
Ile Ile His Asn Ser Ile Asp Asp Leu Ile Asp Glu Phe Asn Leu Leu
    850                 855                 860
Glu Asn Val Ser Asp Glu Leu Tyr Glu Leu Lys Lys Leu Asn Asn Leu
865                 870                 875                 880
Asp Glu Lys Tyr Leu Ile Ser Phe Glu Asp Ile Ser Lys Asn Asn Ser
                885                 890                 895
Thr Tyr Ser Val Arg Phe Ile Asn Lys Ser Asn Gly Glu Ser Val Tyr
            900                 905                 910
Val Glu Thr Glu Lys Glu Ile Phe Ser Lys Tyr Ser Glu His Ile Thr
        915                 920                 925
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Lys Glu Ile Ser Thr Ile Lys Asn Ser Ile Ile Thr Asp Val Asn Gly
    930                 935                 940
Asn Leu Leu Asp Asn Ile Gln Leu Asp His Thr Ser Gln Val Asn Thr
945                 950                 955                 960
Leu Asn Ala Ala Phe Phe Ile Gln Ser Leu Ile Asp Tyr Ser Ser Asn
                965                 970                 975
Lys Asp Val Leu Asn Asp Leu Ser Thr Ser Val Lys Val Gln Leu Tyr
            980                 985                 990
Ala Gln Leu Phe Ser Thr Gly Leu Asn Thr Ile Tyr Asp Ser Ile Gln
        995                 1000                1005
Leu Val Asn Leu Ile Ser Asn Ala Val Asn Asp Thr Ile Asn Val Leu
    1010                1015                1020
Pro Thr Ile Thr Glu Gly Ile Pro Ile Val Ser Thr Ile Leu Asp Gly
1025                1030                1035                1040
Ile Asn Leu Gly Ala Ala Ile Lys Glu Leu Leu Asp Glu His Asp Pro
                1045                1050                1055
Leu Leu Lys Lys Glu Leu Glu Ala Lys Val Gly Val Leu Ala Ile Asn
            1060                1065                1070
Met Ser Leu Ser Ile Ala Ala Thr Val Ala Ser Ile Val Gly Ile Gly
        1075                1080                1085
Ala Glu Val Thr Ile Phe Leu Leu Pro Ile Ala Gly Ile Ser Ala Gly
    1090                1095                1100
Ile Pro Ser Leu Val Asn Asn Glu Leu Ile Leu His Asp Lys Ala Thr
1105                1110                1115                1120
Ser Val Val Asn Tyr Phe Asn His Leu Ser Glu Ser Lys Lys Tyr Gly
                1125                1130                1135
Pro Leu Lys Thr Glu Asp Asp Lys Ile Leu Val Pro Ile Asp Asp Leu
            1140                1145                1150
Val Ile Ser Glu Ile Asp Phe Asn Asn Asn Ser Ile Lys Leu Gly Thr
        1155                1160                1165
Cys Asn Ile Leu Ala Met Glu Gly Gly Ser Gly His Thr Val Thr Gly
    1170                1175                1180
Asn Ile Asp His Phe Phe Ser Ser Pro Ser Ile Ser Ser His Ile Pro
1185                1190                1195                1200
Ser Leu Ser Ile Tyr Ser Ala Ile Gly Ile Glu Thr Glu Asn Leu Asp
                1205                1210                1215
Phe Ser Lys Lys Ile Met Met Leu Pro Asn Ala Pro Ser Arg Val Phe
            1220                1225                1230
Trp Trp Glu Thr Gly Ala Val Pro Gly Leu Arg Ser Leu Glu Asn Asp
        1235                1240                1245
Gly Thr Arg Leu Leu Asp Ser Ile Arg Asp Leu Tyr Pro Gly Lys Phe
    1250                1255                1260
Tyr Trp Arg Phe Tyr Ala Phe Phe Asp Tyr Ala Ile Thr Thr Leu Lys
1265                1270                1275                1280
Pro Val Tyr Glu Asp Thr Asn Ile Lys Ile Lys Leu Asp Lys Asp Thr
                1285                1290                1295
Arg Asn Phe Ile Met Pro Thr Ile Thr Thr Asn Glu Ile Arg Asn Lys
            1300                1305                1310
Leu Ser Tyr Ser Phe Asp Gly Ala Gly Gly Thr Tyr Ser Leu Leu Leu
        1315                1320                1325
Ser Ser Tyr Pro Ile Ser Thr Asn Ile Asn Leu Ser Lys Asp Asp Leu
    1330                1335                1340
Trp Ile Phe Asn Ile Asp Asn Glu Val Arg Glu Ile Ser Ile Glu Asn
1345                1350                1355                1360
Gly Thr Ile Lys Lys Gly Lys Leu Ile Lys Asp Val Leu Ser Lys Ile
                1365                1370                1375
Asp Ile Asn Lys Asn Lys Leu Ile Ile Gly Asn Gln Thr Ile Asp Phe
            1380                1385                1390
Ser Gly Asp Ile Asp Asn Lys Asp Arg Tyr Ile Phe Leu Thr Cys Glu
        1395                1400                1405
Leu Asp Asp Lys Ile Ser Leu Ile Ile Glu Ile Asn Leu Val Ala Lys
    1410                1415                1420
Ser Tyr Ser Leu Leu Leu Ser Gly Asp Lys Asn Tyr Leu Ile Ser Asn
1425                1430                1435                1440
Leu Ser Asn Thr Ile Glu Lys Ile Asn Thr Leu Gly Leu Asp Ser Lys
                1445                1450                1455
Asn Ile Ala Tyr Asn Tyr Thr Asp Glu Ser Asn Asn Lys Tyr Phe Gly
            1460                1465                1470
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Ala Ile Ser Lys Thr Ser Gln Lys Ser Ile Ile His Tyr Lys Lys Asp
        1475                1480                1485
Ser Lys Asn Ile Leu Glu Phe Tyr Asn Asp Ser Thr Leu Glu Phe Asn
    1490                1495                1500
Ser Lys Asp Phe Ile Ala Glu Asp Ile Asn Val Phe Met Lys Asp Asp
1505                1510                1515                1520
Ile Asn Thr Ile Thr Gly Lys Tyr Tyr Val Asp Asn Asn Thr Asp Lys
                1525                1530                1535
Ser Ile Asp Phe Ser Ile Ser Leu Val Ser Lys Asn Gln Val Lys Val
            1540                1545                1550
Asn Gly Leu Tyr Leu Asn Glu Ser Val Tyr Ser Ser Tyr Leu Asp Phe
        1555                1560                1565
Val Lys Asn Ser Asp Gly His His Asn Thr Ser Asn Phe Met Asn Leu
    1570                1575                1580
Phe Leu Asp Asn Ile Ser Phe Trp Lys Leu Phe Gly Phe Glu Asn Ile
1585                1590                1595                1600
Asn Phe Val Ile Asp Lys Tyr Phe Thr Leu Val Gly Lys Thr Asn Leu
                1605                1610                1615
Gly Tyr Val Glu Phe Ile Cys Asp Asn Asn Lys Asn Ile Asp Ile Tyr
            1620                1625                1630
Phe Gly Glu Trp Lys Thr Ser Ser Ser Lys Ser Thr Ile Phe Ser Gly
        1635                1640                1645
Asn Gly Arg Asn Val Val Val Glu Pro Ile Tyr Asn Pro Asp Thr Gly
    1650                1655                1660
Glu Asp Ile Ser Thr Ser Leu Asp Phe Ser Tyr Glu Pro Leu Tyr Gly
1665                1670                1675                1680
Ile Asp Arg Tyr Ile Asn Lys Val Leu Ile Ala Pro Asp Leu Tyr Thr
                1685                1690                1695
Ser Leu Ile Asn Ile Asn Thr Asn Tyr Tyr Ser Asn Glu Tyr Tyr Pro
            1700                1705                1710
Glu Ile Ile Val Leu Asn Pro Asn Thr Phe His Lys Lys Val Asn Ile
        1715                1720                1725
Asn Leu Asp Ser Ser Ser Phe Glu Tyr Lys Trp Ser Thr Glu Gly Ser
    1730                1735                1740
Asp Phe Ile Leu Val Arg Tyr Leu Glu Glu Ser Asn Lys Lys Ile Leu
1745                1750                1755                1760
Gln Lys Ile Arg Ile Lys Gly Ile Leu Ser Asn Thr Gln Ser Phe Asn
                1765                1770                1775
Lys Met Ser Ile Asp Phe Lys Asp Ile Lys Lys Leu Ser Leu Gly Tyr
            1780                1785                1790
Ile Met Ser Asn Phe Lys Ser Phe Asn Ser Glu Asn Glu Leu Asp Arg
        1795                1800                1805
Asp His Leu Gly Phe Lys Ile Ile Asp Asn Lys Thr Tyr Tyr Tyr Asp
    1810                1815                1820
Glu Asp Ser Lys Leu Val Lys Gly Leu Ile Asn Ile Asn Asn Ser Leu
1825                1830                1835                1840
Phe Tyr Phe Asp Pro Ile Glu Phe Asn Leu Val Thr Gly Trp Gln Thr
                1845                1850                1855
Ile Asn Gly Lys Lys Tyr Tyr Phe Asp Ile Asn Thr Gly Ala Ala Leu
            1860                1865                1870
Thr Ser Tyr Lys Ile Ile Asn Gly Lys His Phe Tyr Phe Asn Asn Asp
        1875                1880                1885
Gly Val Met Gln Leu Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr
    1890                1895                1900
Phe Ala Pro Ala Asn Thr Gln Asn Asn Asn Ile Glu Gly Gln Ala Ile
1905                1910                1915                1920
Val Tyr Gln Ser Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe
                1925                1930                1935
Asp Asn Asn Ser Lys Ala Val Thr Gly Trp Arg Ile Ile Asn Asn Glu
            1940                1945                1950
Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala Ala Val Gly Leu Gln
        1955                1960                1965
Val Ile Asp Asn Asn Lys Tyr Tyr Phe Asn Pro Asp Thr Ala Ile Ile
    1970                1975                1980
Ser Lys Gly Trp Gln Thr Val Asn Gly Ser Arg Tyr Tyr Phe Asp Thr
1985                1990                1995                2000
Asp Thr Ala Ile Ala Phe Asn Gly Tyr Lys Thr Ile Asp Gly Lys His
                2005                2010                2015
```

```
Phe Tyr Phe Asp Ser Asp Cys Val Val Lys Ile Gly Val Phe Ser Thr
            2020                2025                2030
Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Tyr Asn Asn Asn
        2035                2040                2045
Ile Glu Gly Gln Ala Ile Val Tyr Gln Ser Lys Phe Leu Thr Leu Asn
    2050                2055                2060
Gly Lys Lys Tyr Tyr Phe Asp Asn Asn Ser Lys Ala Val Thr Gly Leu
2065                2070                2075                2080
Gln Thr Ile Asp Ser Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Glu
                2085                2090                2095
Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn
            2100                2105                2110
Thr Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys
        2115                2120                2125
Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Ile Ala Ser Thr Gly Tyr Thr
    2130                2135                2140
Ile Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln
2145                2150                2155                2160
Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala
                2165                2170                2175
Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn
            2180                2185                2190
Glu Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser
        2195                2200                2205
Lys Ala Val Thr Gly Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe
    2210                2215                2220
Asn Pro Asn Asn Ala Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn
2225                2230                2235                2240
Asp Lys Tyr Tyr Phe Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile
                2245                2250                2255
Thr Ile Glu Arg Asn Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys
            2260                2265                2270
Met Val Thr Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala
        2275                2280                2285
Pro Ala Asn Thr His Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr
    2290                2295                2300
Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn
2305                2310                2315                2320
Asp Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
                2325                2330                2335
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
            2340                2345                2350
Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr
        2355                2360                2365
Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr
    2370                2375                2380
Phe Ile Ala Ser Thr Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr
2385                2390                2395                2400
Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn
                2405                2410                2415
Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu
            2420                2425                2430
Gly Gln Ala Ile Leu Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys
        2435                2440                2445
Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr
    2450                2455                2460
Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val
2465                2470                2475                2480
Thr Gly Trp Gln Thr Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
                2485                2490                2495
Thr Ser Ile Ala Ser Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe
            2500                2505                2510
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
        2515                2520                2525
Asp Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
    2530                2535                2540
Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp
2545                2550                2555                2560
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Asn Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val
                2565                2570                2575
Thr Ile Asp Gly Asn Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly
            2580                2585                2590
Ala Asn Gly Tyr Lys Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn
        2595                2600                2605
Gly Leu Pro Gln Ile Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr
    2610                2615                2620
Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile
2625                2630                2635                2640
Arg Tyr Gln Asn Arg Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe
                2645                2650                2655
Gly Asn Asn Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys
            2660                2665                2670
Val Tyr Tyr Phe Met Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu
        2675                2680                2685
Phe Glu Ile Asp Gly Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys
    2690                2695                2700
Ala Pro Gly Ile Tyr Gly
2705                2710


<210> 2
<211> 2366
<212> PRT
<213> Clostridium difficile

<400> 2
Met Ser Leu Val Asn Arg Lys Gln Leu Glu Lys Met Ala Asn Val Arg
 1                5                  10                  15
Phe Arg Thr Gln Glu Asp Glu Tyr Val Ala Ile Leu Asp Ala Leu Glu
            20                  25                  30
Glu Tyr His Asn Met Ser Glu Asn Thr Val Val Glu Lys Tyr Leu Lys
        35                  40                  45
Leu Lys Asp Ile Asn Ser Leu Thr Asp Ile Tyr Ile Asp Thr Tyr Lys
    50                  55                  60
Lys Ser Gly Arg Asn Lys Ala Leu Lys Lys Phe Lys Glu Tyr Leu Val
65                  70                  75                  80
Thr Glu Val Leu Glu Leu Lys Asn Asn Asn Leu Thr Pro Val Glu Lys
                85                  90                  95
Asn Leu His Phe Val Trp Ile Gly Gly Gln Ile Asn Asp Thr Ala Ile
            100                 105                 110
Asn Tyr Ile Asn Gln Trp Lys Asp Val Asn Ser Asp Tyr Asn Val Asn
        115                 120                 125
Val Phe Tyr Asp Ser Asn Ala Phe Leu Ile Asn Thr Leu Lys Lys Thr
    130                 135                 140
Val Val Glu Ser Ala Ile Asn Asp Thr Leu Glu Ser Phe Arg Glu Asn
145                 150                 155                 160
Leu Asn Asp Pro Arg Phe Asp Tyr Asn Lys Phe Phe Arg Lys Arg Met
                165                 170                 175
Glu Ile Ile Tyr Asp Lys Gln Lys Asn Phe Ile Asn Tyr Tyr Lys Ala
            180                 185                 190
Gln Arg Glu Glu Asn Pro Glu Leu Ile Ile Asp Asp Ile Val Lys Thr
        195                 200                 205
Tyr Leu Ser Asn Glu Tyr Ser Lys Glu Ile Asp Glu Leu Asn Thr Tyr
    210                 215                 220
Ile Glu Glu Ser Leu Asn Lys Ile Thr Gln Asn Ser Gly Asn Asp Val
225                 230                 235                 240
Arg Asn Phe Glu Glu Phe Lys Asn Gly Glu Ser Phe Asn Leu Tyr Glu
                245                 250                 255
Gln Glu Leu Val Glu Arg Trp Asn Leu Ala Ala Ala Ser Asp Ile Leu
            260                 265                 270
Arg Ile Ser Ala Leu Lys Glu Ile Gly Gly Met Tyr Leu Asp Val Asp
        275                 280                 285
Met Leu Pro Gly Ile Gln Pro Asp Leu Phe Glu Ser Ile Glu Lys Pro
    290                 295                 300
Ser Ser Val Thr Val Asp Phe Trp Glu Met Thr Lys Leu Glu Ala Ile
305                 310                 315                 320
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```
Met Lys Tyr Lys Glu Tyr Ile Pro Glu Tyr Thr Ser Glu His Phe Asp
                325                 330                 335
Met Leu Asp Glu Glu Val Gln Ser Ser Phe Glu Ser Val Leu Ala Ser
            340                 345                 350
Lys Ser Asp Lys Ser Glu Ile Phe Ser Ser Leu Gly Asp Met Glu Ala
        355                 360                 365
Ser Pro Leu Glu Val Lys Ile Ala Phe Asn Ser Lys Gly Ile Ile Asn
    370                 375                 380
Gln Gly Leu Ile Ser Val Lys Asp Ser Tyr Cys Ser Asn Leu Ile Val
385                 390                 395                 400
Lys Gln Ile Glu Asn Arg Tyr Lys Ile Leu Asn Asn Ser Leu Asn Pro
                405                 410                 415
Ala Ile Ser Glu Asp Asn Asp Phe Asn Thr Thr Thr Asn Thr Phe Ile
            420                 425                 430
Asp Ser Ile Met Ala Glu Ala Asn Ala Asp Asn Gly Arg Phe Met Met
        435                 440                 445
Glu Leu Gly Lys Tyr Leu Arg Val Gly Phe Phe Pro Asp Val Lys Thr
    450                 455                 460
Thr Ile Asn Leu Ser Gly Pro Glu Ala Tyr Ala Ala Ala Tyr Gln Asp
465                 470                 475                 480
Leu Leu Met Phe Lys Glu Gly Ser Met Asn Ile His Leu Ile Glu Ala
                485                 490                 495
Asp Leu Arg Asn Phe Glu Ile Ser Lys Thr Asn Ile Ser Gln Ser Thr
            500                 505                 510
Glu Gln Glu Met Ala Ser Leu Trp Ser Phe Asp Asp Ala Arg Ala Lys
        515                 520                 525
Ala Gln Phe Glu Glu Tyr Lys Arg Asn Tyr Phe Glu Gly Ser Leu Gly
    530                 535                 540
Glu Asp Asp Asn Leu Asp Phe Ser Gln Asn Ile Val Val Asp Lys Glu
545                 550                 555                 560
Tyr Leu Leu Glu Lys Ile Ser Ser Leu Ala Arg Ser Ser Glu Arg Gly
                565                 570                 575
Tyr Ile His Tyr Ile Val Gln Leu Gln Gly Asp Lys Ile Ser Tyr Glu
            580                 585                 590
Ala Ala Cys Asn Leu Phe Ala Lys Thr Pro Tyr Asp Ser Val Leu Phe
        595                 600                 605
Gln Lys Asn Ile Glu Asp Ser Glu Ile Ala Tyr Tyr Tyr Asn Pro Gly
    610                 615                 620
Asp Gly Glu Ile Gln Glu Ile Asp Lys Tyr Lys Ile Pro Ser Ile Ile
625                 630                 635                 640
Ser Asp Arg Pro Lys Ile Lys Leu Thr Phe Ile Gly His Gly Lys Asp
                645                 650                 655
Glu Phe Asn Thr Asp Ile Phe Ala Gly Phe Asp Val Asp Ser Leu Ser
            660                 665                 670
Thr Glu Ile Glu Ala Ala Ile Asp Leu Ala Lys Glu Asp Ile Ser Pro
        675                 680                 685
Lys Ser Ile Glu Ile Asn Leu Leu Gly Cys Asn Met Phe Ser Tyr Ser
    690                 695                 700
Ile Asn Val Glu Glu Thr Tyr Pro Gly Lys Leu Leu Leu Lys Val Lys
705                 710                 715                 720
Asp Lys Ile Ser Glu Leu Met Pro Ser Ile Ser Gln Asp Ser Ile Ile
                725                 730                 735
Val Ser Ala Asn Gln Tyr Glu Val Arg Ile Asn Ser Glu Gly Arg Arg
            740                 745                 750
Glu Leu Leu Asp His Ser Gly Glu Trp Ile Asn Lys Glu Glu Ser Ile
        755                 760                 765
Ile Lys Asp Ile Ser Ser Lys Glu Tyr Ile Ser Phe Asn Pro Lys Glu
    770                 775                 780
Asn Lys Ile Thr Val Lys Ser Lys Asn Leu Pro Glu Leu Ser Thr Leu
785                 790                 795                 800
Leu Gln Glu Ile Arg Asn Asn Ser Asn Ser Ser Asp Ile Glu Leu Glu
                805                 810                 815
Glu Lys Val Met Leu Thr Glu Cys Glu Ile Asn Val Ile Ser Asn Ile
            820                 825                 830
Asp Thr Gln Ile Val Glu Glu Arg Ile Glu Glu Ala Lys Asn Leu Thr
        835                 840                 845
Ser Asp Ser Ile Asn Tyr Ile Lys Asp Glu Phe Lys Leu Ile Glu Ser
    850                 855                 860
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```
Ile Ser Asp Ala Leu Cys Asp Leu Lys Gln Gln Asn Glu Leu Glu Asp
865                 870                 875                 880
Ser His Phe Ile Ser Phe Glu Asp Ile Ser Glu Thr Asp Glu Gly Phe
                885                 890                 895
Ser Ile Arg Phe Ile Asn Lys Glu Thr Gly Glu Ser Ile Phe Val Glu
            900                 905                 910
Thr Glu Lys Thr Ile Phe Ser Glu Tyr Ala Asn His Ile Thr Glu Glu
        915                 920                 925
Ile Ser Lys Ile Lys Gly Thr Ile Phe Asp Thr Val Asn Gly Lys Leu
    930                 935                 940
Val Lys Lys Val Asn Leu Asp Thr Thr His Glu Val Asn Thr Leu Asn
945                 950                 955                 960
Ala Ala Phe Phe Ile Gln Ser Leu Ile Glu Tyr Asn Ser Ser Lys Glu
                965                 970                 975
Ser Leu Ser Asn Leu Ser Val Ala Met Lys Val Gln Val Tyr Ala Gln
            980                 985                 990
Leu Phe Ser Thr Gly Leu Asn Thr Ile Thr Asp Ala Ala Lys Val Val
        995                 1000                1005
Glu Leu Val Ser Thr Ala Leu Asp Glu Thr Ile Asp Leu Leu Pro Thr
    1010                1015                1020
Leu Ser Glu Gly Leu Pro Ile Ile Ala Thr Ile Ile Asp Gly Val Ser
1025                1030                1035                1040
Leu Gly Ala Ala Ile Lys Glu Leu Ser Glu Thr Ser Asp Pro Leu Leu
                1045                1050                1055
Arg Gln Glu Ile Glu Ala Lys Ile Gly Ile Met Ala Val Asn Leu Thr
            1060                1065                1070
Thr Ala Thr Thr Ala Ile Ile Thr Ser Ser Leu Gly Ile Ala Ser Gly
        1075                1080                1085
Phe Ser Ile Leu Leu Val Pro Leu Ala Gly Ile Ser Ala Gly Ile Pro
    1090                1095                1100
Ser Leu Val Asn Asn Glu Leu Val Leu Arg Asp Lys Ala Thr Lys Val
1105                1110                1115                1120
Val Asp Tyr Phe Lys His Val Ser Leu Val Glu Thr Glu Gly Val Phe
                1125                1130                1135
Thr Leu Leu Asp Asp Lys Ile Met Met Pro Gln Asp Asp Leu Val Ile
            1140                1145                1150
Ser Glu Ile Asp Phe Asn Asn Asn Ser Ile Val Leu Gly Lys Cys Glu
        1155                1160                1165
Ile Trp Arg Met Glu Gly Gly Ser Gly His Thr Val Thr Asp Asp Ile
    1170                1175                1180
Asp His Phe Phe Ser Ala Pro Ser Ile Thr Tyr Arg Glu Pro His Leu
1185                1190                1195                1200
Ser Ile Tyr Asp Val Leu Glu Val Gln Lys Glu Glu Leu Asp Leu Ser
                1205                1210                1215
Lys Asp Leu Met Val Leu Pro Asn Ala Pro Asn Arg Val Phe Ala Trp
            1220                1225                1230
Glu Thr Gly Trp Thr Pro Gly Leu Arg Ser Leu Glu Asn Asp Gly Thr
        1235                1240                1245
Lys Leu Leu Asp Arg Ile Arg Asp Asn Tyr Glu Gly Glu Phe Tyr Trp
    1250                1255                1260
Arg Tyr Phe Ala Phe Ile Ala Asp Ala Leu Ile Thr Thr Leu Lys Pro
1265                1270                1275                1280
Arg Tyr Glu Asp Thr Asn Ile Arg Ile Asn Leu Asp Ser Asn Thr Arg
                1285                1290                1295
Ser Phe Ile Val Pro Ile Ile Thr Thr Glu Tyr Ile Arg Glu Lys Leu
            1300                1305                1310
Ser Tyr Ser Phe Tyr Gly Ser Gly Gly Thr Tyr Ala Leu Ser Leu Ser
        1315                1320                1325
Gln Tyr Asn Met Gly Ile Asn Ile Glu Leu Ser Glu Ser Asp Val Trp
    1330                1335                1340
Ile Ile Asp Val Asp Asn Val Val Arg Asp Val Thr Ile Glu Ser Asp
1345                1350                1355                1360
Lys Ile Lys Lys Gly Asp Leu Ile Glu Gly Ile Leu Ser Thr Leu Ser
                1365                1370                1375
Ile Glu Glu Asn Lys Ile Ile Leu Asn Ser His Glu Ile Asn Phe Ser
            1380                1385                1390
Gly Glu Val Asn Gly Ser Asn Gly Phe Val Ser Leu Thr Phe Ser Ile
        1395                1400                1405
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Leu Glu Gly Ile Asn Ala Ile Ile Glu Val Asp Leu Leu Ser Lys Ser
    1410                1415                1420
Tyr Lys Leu Leu Ile Ser Gly Glu Leu Lys Ile Leu Met Leu Asn Ser
1425                1430                1435                1440
Asn His Ile Gln Gln Lys Ile Asp Tyr Ile Gly Phe Asn Ser Glu Leu
                1445                1450                1455
Gln Lys Asn Ile Pro Tyr Ser Phe Val Asp Ser Glu Gly Lys Glu Asn
            1460                1465                1470
Gly Phe Ile Asn Gly Ser Thr Lys Glu Gly Leu Phe Val Ser Glu Leu
        1475                1480                1485
Pro Asp Val Val Leu Ile Ser Lys Val Tyr Met Asp Asp Ser Lys Pro
    1490                1495                1500
Ser Phe Gly Tyr Tyr Ser Asn Asn Leu Lys Asp Val Lys Val Ile Thr
1505                1510                1515                1520
Lys Asp Asn Val Asn Ile Leu Thr Gly Tyr Tyr Leu Lys Asp Asp Ile
                1525                1530                1535
Lys Ile Ser Leu Ser Leu Thr Leu Gln Asp Glu Lys Thr Ile Lys Leu
            1540                1545                1550
Asn Ser Val His Leu Asp Glu Ser Gly Val Ala Glu Ile Leu Lys Phe
        1555                1560                1565
Met Asn Arg Lys Gly Asn Thr Asn Thr Ser Asp Ser Leu Met Ser Phe
    1570                1575                1580
Leu Glu Ser Met Asn Ile Lys Ser Ile Phe Val Asn Phe Leu Gln Ser
1585                1590                1595                1600
Asn Ile Lys Phe Ile Leu Asp Ala Asn Phe Ile Ile Ser Gly Thr Thr
                1605                1610                1615
Ser Ile Gly Gln Phe Glu Phe Ile Cys Asp Glu Asn Asp Asn Ile Gln
            1620                1625                1630
Pro Tyr Phe Ile Lys Phe Asn Thr Leu Glu Thr Asn Tyr Thr Leu Tyr
        1635                1640                1645
Val Gly Asn Arg Gln Asn Met Ile Val Glu Pro Asn Tyr Asp Leu Asp
    1650                1655                1660
Asp Ser Gly Asp Ile Ser Ser Thr Val Ile Asn Phe Ser Gln Lys Tyr
1665                1670                1675                1680
Leu Tyr Gly Ile Asp Ser Cys Val Asn Lys Val Val Ile Ser Pro Asn
                1685                1690                1695
Ile Tyr Thr Asp Glu Ile Asn Ile Thr Pro Val Tyr Glu Thr Asn Asn
            1700                1705                1710
Thr Tyr Pro Glu Val Ile Val Leu Asp Ala Asn Tyr Ile Asn Glu Lys
        1715                1720                1725
Ile Asn Val Asn Ile Asn Asp Leu Ser Ile Arg Tyr Val Trp Ser Asn
    1730                1735                1740
Asp Gly Asn Asp Phe Ile Leu Met Ser Thr Ser Glu Glu Asn Lys Val
1745                1750                1755                1760
Ser Gln Val Lys Ile Arg Phe Val Asn Val Phe Lys Asp Lys Thr Leu
                1765                1770                1775
Ala Asn Lys Leu Ser Phe Asn Phe Ser Asp Lys Gln Asp Val Pro Val
            1780                1785                1790
Ser Glu Ile Ile Leu Ser Phe Thr Pro Ser Tyr Tyr Glu Asp Gly Leu
        1795                1800                1805
Ile Gly Tyr Asp Leu Gly Leu Val Ser Leu Tyr Asn Glu Lys Phe Tyr
    1810                1815                1820
Ile Asn Asn Phe Gly Met Met Val Ser Gly Leu Ile Tyr Ile Asn Asp
1825                1830                1835                1840
Ser Leu Tyr Tyr Phe Lys Pro Pro Val Asn Asn Leu Ile Thr Gly Phe
                1845                1850                1855
Val Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn Pro Ile Asn Gly Gly
            1860                1865                1870
Ala Ala Ser Ile Gly Glu Thr Ile Ile Asp Asp Lys Asn Tyr Tyr Phe
        1875                1880                1885
Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe Ser Thr Glu Asp Gly
    1890                1895                1900
Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly
1905                1910                1915                1920
Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr
                1925                1930                1935
Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys Glu Leu Asp
            1940                1945                1950
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Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly
1955 1960 1965
Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val
1970 1975 1980
Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp
1985 1990 1995 2000
Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His
2005 2010 2015
Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr
2020 2025 2030
Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn
2035 2040 2045
Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn
2050 2055 2060
Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys
2065 2070 2075 2080
Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu
2085 2090 2095
Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn
2100 2105 2110
Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val
2115 2120 2125
Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile
2130 2135 2140
Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly
2145 2150 2155 2160
Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr
2165 2170 2175
Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val
2180 2185 2190
Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu
2195 2200 2205
Thr Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe
2210 2215 2220
Asn Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp
2225 2230 2235 2240
Ile Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile
2245 2250 2255
Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln
2260 2265 2270
Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp
2275 2280 2285
Gly Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr
2290 2295 2300
Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile
2305 2310 2315 2320
Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr
2325 2330 2335
Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu
2340 2345 2350
Tyr Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
2355 2360 2365

<210> 3
<211> 966
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion 1

<400> 3
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro

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        35                  40                  45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
    50                  55                  60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65                  70                  75                  80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
                85                  90                  95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
            100                 105                 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
        115                 120                 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
    130                 135                 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145                 150                 155                 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
                165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545                 550                 555                 560
Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly Val Ile
                565                 570                 575
Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Pro Gly Phe Val Ser Ile
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580 585 590
Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly
595 600 605
Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu
610 615 620
Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala
625 630 635 640
His His Asn Glu Asp Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr
645 650 655
Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser
660 665 670
Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr
675 680 685
Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile
690 695 700
Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly
705 710 715 720
Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile
725 730 735
Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp
740 745 750
Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr
755 760 765
Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln
770 775 780
Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr
785 790 795 800
Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu
805 810 815
Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys
820 825 830
Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys
835 840 845
Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr
850 855 860
Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp
865 870 875 880
Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met Gln Ile Gly Val Phe
885 890 895
Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp
900 905 910
Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu
915 920 925
Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly
930 935 940
Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala
945 950 955 960
Gln Leu Val Ile Ser Glu
965

<210> 4
<211> 966
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion 2

<400> 4
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60

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Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65                  70                  75                  80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
                85                  90                  95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
            100                 105                 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
        115                 120                 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
    130                 135                 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145                 150                 155                 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
                165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545                 550                 555                 560
Thr Ala Met Ala Ala Ala Gly Gly Leu Asn Gln Ile Gly Asp Tyr Lys
                565                 570                 575
Tyr Tyr Phe Asn Ser Asp Gly Val Met Gln Lys Gly Phe Val Ser Ile
            580                 585                 590
Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly
        595                 600                 605
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Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu
610 615 620
Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala
625 630 635 640
His His Asn Glu Asp Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr
645 650 655
Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser
660 665 670
Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr
675 680 685
Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile
690 695 700
Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly
705 710 715 720
Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile
725 730 735
Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp
740 745 750
Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr
755 760 765
Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln
770 775 780
Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr
785 790 795 800
Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu
805 810 815
Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys
820 825 830
Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys
835 840 845
Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr
850 855 860
Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp
865 870 875 880
Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met Gln Ile Gly Val Phe
885 890 895
Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp
900 905 910
Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu
915 920 925
Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly
930 935 940
Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala
945 950 955 960
Gln Leu Val Ile Ser Glu
965

<210> 5
<211> 833
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion 3

<400> 5
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65 70 75 80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg

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                85                  90                  95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
            100                 105                 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
        115                 120                 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
    130                 135                 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145                 150                 155                 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
                165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala His His Asn Glu Asp
            500                 505                 510
Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn
        515                 520                 525
Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val
    530                 535                 540
Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp
545                 550                 555                 560
Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr
                565                 570                 575
Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn
            580                 585                 590
Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val
        595                 600                 605
Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val
    610                 615                 620
Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro
```

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

<210> 6
<211> 1057
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion 4

<400> 6
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65 70 75 80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
85 90 95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
100 105 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
115 120 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
130 135 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145 150 155 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
165 170 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
180 185 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
195 200 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
210 215 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225 230 235 240

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Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545                 550                 555                 560
Thr Ala Met Ala Ala Ala Gly Gly Glu Thr Ile Ile Asp Asp Lys Asn
                565                 570                 575
Tyr Tyr Phe Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe Ser Thr
            580                 585                 590
Glu Asp Gly Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn
        595                 600                 605
Leu Glu Gly Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu
    610                 615                 620
Asn Ile Tyr Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys
625                 630                 635                 640
Glu Leu Asp Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala
                645                 650                 655
Phe Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser
            660                 665                 670
Asp Gly Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His
        675                 680                 685
Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp
    690                 695                 700
Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val
705                 710                 715                 720
Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp
                725                 730                 735
Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn
            740                 745                 750
Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val
        755                 760                 765
Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp
    770                 775                 780
```

Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr
785 790 795 800
Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn
805 810 815
Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val
820 825 830
Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val
835 840 845
Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro
850 855 860
Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser
865 870 875 880
Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr
885 890 895
Thr Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys
900 905 910
Tyr Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu
915 920 925
Ile Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr
930 935 940
Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly
945 950 955 960
Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe
965 970 975
Gly Glu Asp Gly Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly
980 985 990
Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly
995 1000 1005
Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr
1010 1015 1020
Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp
1025 1030 1035 1040
Gly Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser
1045 1050 1055
Glu

<210> 7
<211> 971
<212> PRT
<213> Artificial Sequence

<220>
<223> Fusion 5

<400> 7
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65 70 75 80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
85 90 95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
100 105 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
115 120 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
130 135 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145 150 155 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn

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                 165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545                 550                 555                 560
Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly Val Ile
                565                 570                 575
Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Pro Gly Ile Tyr Gly Gly
            580                 585                 590
Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly
        595                 600                 605
Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe
    610                 615                 620
Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly
625                 630                 635                 640
Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu Glu Gly
                645                 650                 655
Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr
            660                 665                 670
Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu
        675                 680                 685
Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile
    690                 695                 700
Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly
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705 710 715 720
Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe
725 730 735
Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn
740 745 750
Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp
755 760 765
Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp
770 775 780
Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly
785 790 795 800
Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp
805 810 815
Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu
820 825 830
Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr
835 840 845
Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu
850 855 860
Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr
865 870 875 880
Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met
885 890 895
Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His
900 905 910
Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr
915 920 925
Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr
930 935 940
Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe
945 950 955 960
Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
965 970

<210> 8
<211> 321
<212> PRT
<213> Artificial Sequence

<220>
<223> individual toxin A fragment

<400> 8
Met Ala Ser Thr Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe
1 5 10 15
Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly
20 25 30
Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly
35 40 45
Gln Ala Ile Leu Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys
50 55 60
Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile
65 70 75 80
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr
85 90 95
Gly Trp Gln Thr Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr
100 105 110
Ser Ile Ala Ser Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr
115 120 125
Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp
130 135 140
Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu
145 150 155 160
Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn
165 170 175
Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr
180 185 190

```
Ile Asp Gly Asn Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala
        195                 200                 205
Asn Gly Tyr Lys Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly
    210                 215                 220
Leu Pro Gln Ile Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe
225                 230                 235                 240
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg
                245                 250                 255
Tyr Gln Asn Arg Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly
            260                 265                 270
Asn Asn Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val
        275                 280                 285
Tyr Tyr Phe Met Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe
    290                 295                 300
Glu Ile Asp Gly Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala
305                 310                 315                 320
Pro
```

<210> 9
<211> 612
<212> PRT
<213> Artificial Sequence

<220>
<223> individual toxin B fragment

<400> 9

```
Met Ile Leu Met Ser Thr Ser Glu Glu Asn Lys Val Ser Gln Val Lys
 1                5                  10                  15
Ile Arg Phe Val Asn Val Phe Lys Asp Lys Thr Leu Ala Asn Lys Leu
            20                  25                  30
Ser Phe Asn Phe Ser Asp Lys Gln Asp Val Pro Val Ser Glu Ile Ile
        35                  40                  45
Leu Ser Phe Thr Pro Ser Tyr Tyr Glu Asp Gly Leu Ile Gly Tyr Asp
    50                  55                  60
Leu Gly Leu Val Ser Leu Tyr Asn Glu Lys Phe Tyr Ile Asn Asn Phe
65                  70                  75                  80
Gly Met Met Val Ser Gly Leu Ile Tyr Ile Asn Asp Ser Leu Tyr Tyr
                85                  90                  95
Phe Lys Pro Pro Val Asn Asn Leu Ile Thr Gly Phe Val Thr Val Gly
            100                 105                 110
Asp Asp Lys Tyr Tyr Phe Asn Pro Ile Asn Gly Gly Ala Ala Ser Ile
        115                 120                 125
Gly Glu Thr Ile Ile Asp Asp Lys Asn Tyr Tyr Phe Asn Gln Ser Gly
    130                 135                 140
Val Leu Gln Thr Gly Val Phe Ser Thr Glu Asp Gly Phe Lys Tyr Phe
145                 150                 155                 160
Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly Glu Ala Ile Asp
                165                 170                 175
Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr Tyr Phe Asp Asp
            180                 185                 190
Asn Tyr Arg Gly Ala Val Glu Trp Lys Glu Leu Asp Gly Glu Met His
        195                 200                 205
Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly Leu Asn Gln Ile
    210                 215                 220
Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val Met Gln Lys Gly
225                 230                 235                 240
Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly Val
                245                 250                 255
Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe Ala
            260                 265                 270
Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly Phe
        275                 280                 285
Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu Glu Gly Glu
    290                 295                 300
Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr
```

305 310 315 320
Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp
325 330 335
Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly
340 345 350
Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly Ile
355 360 365
Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe Ser
370 375 380
Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn Tyr
385 390 395 400
Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp Thr
405 410 415
Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn
420 425 430
Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly Glu
435 440 445
Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp Ile
450 455 460
Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu Thr
465 470 475 480
Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr Tyr
485 490 495
Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu Asn
500 505 510
Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr Ile
515 520 525
Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met Gln
530 535 540
Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His Gln
545 550 555 560
Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr Gly
565 570 575
Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile
580 585 590
Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp
595 600 605
Pro Asp Thr Ala
610

<210> 10
<211> 587
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment from fusion 1

<400> 10
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65 70 75 80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
85 90 95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
100 105 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
115 120 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
130 135 140

```
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145                 150                 155                 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
                165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545                 550                 555                 560
Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly Val Ile
                565                 570                 575
Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Pro
            580                 585


<210> 11
<211> 567
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment from fusion 2

<400> 11
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
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```
 1               5                  10                  15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
            20                  25                  30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
        35                  40                  45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
    50                  55                  60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65                  70                  75                  80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
                85                  90                  95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
            100                 105                 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
        115                 120                 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
    130                 135                 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145                 150                 155                 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
                165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
```

545 550 555 560
Thr Ala Met Ala Ala Ala Gly
565

<210> 12
<211> 505
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment from fusion 3

<400> 12
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65 70 75 80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
85 90 95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
100 105 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
115 120 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
130 135 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145 150 155 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
165 170 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
180 185 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
195 200 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
210 215 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225 230 235 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
245 250 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
260 265 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
275 280 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
290 295 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305 310 315 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
325 330 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
340 345 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
355 360 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
370 375 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385 390 395 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
405 410 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
420 425 430

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Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr
            500                 505


<210> 13
<211> 567
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment from fusion 4

<400> 13
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
 1               5                  10                  15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
            20                  25                  30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
        35                  40                  45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
    50                  55                  60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65                  70                  75                  80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
                85                  90                  95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
            100                 105                 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
        115                 120                 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
    130                 135                 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145                 150                 155                 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
                165                 170                 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
            180                 185                 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
        195                 200                 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
    210                 215                 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225                 230                 235                 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
                245                 250                 255
Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
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370 375 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385 390 395 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
405 410 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
420 425 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
435 440 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
450 455 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465 470 475 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
485 490 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
500 505 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
515 520 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
530 535 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545 550 555 560
Thr Ala Met Ala Ala Ala Gly
565

<210> 14
<211> 591
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment from fusion 5

<400> 14
Met Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
1 5 10 15
Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys His Phe
20 25 30
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
35 40 45
Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
50 55 60
Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu Asn Gly
65 70 75 80
Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Trp Arg
85 90 95
Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala Ile Ala
100 105 110
Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe Ser Tyr
115 120 125
Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn Asn Phe
130 135 140
Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val Phe Lys
145 150 155 160
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn
165 170 175
Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu Thr Leu
180 185 190
Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val Thr Gly
195 200 205
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala
210 215 220
Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe
225 230 235 240
Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly
245 250 255

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Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr Gly Tyr
            260                 265                 270
Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile Met
        275                 280                 285
Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
    290                 295                 300
Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln
305                 310                 315                 320
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp
                325                 330                 335
Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys Tyr Tyr
            340                 345                 350
Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr Ile Asn
        355                 360                 365
Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser Thr Gly
    370                 375                 380
Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp Gly Ile
385                 390                 395                 400
Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr Phe Ala
                405                 410                 415
Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr
            420                 425                 430
Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe Gly Asn
        435                 440                 445
Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn Arg Tyr
    450                 455                 460
Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys Thr Ile
465                 470                 475                 480
Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile Gly Val
                485                 490                 495
Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp
            500                 505                 510
Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu
        515                 520                 525
His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Val
    530                 535                 540
Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met Pro Asp
545                 550                 555                 560
Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly Val Ile
                565                 570                 575
Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Pro Gly Ile Tyr Gly
            580                 585                 590
```

<210> 15
<211> 379
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment from fusion 1

<400> 15

```
Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly
 1               5                  10                  15
Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe
            20                  25                  30
Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly
        35                  40                  45
Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu Glu Gly
    50                  55                  60
Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr
65                  70                  75                  80
Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu
                85                  90                  95
Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile
            100                 105                 110
Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly
```

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


<210> 16
<211> 399
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment from fusion 2

<400> 16
Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly
 1                5                  10                  15
Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe
            20                  25                  30
Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys
        35                  40                  45
His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn
    50                  55                  60
Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly
65                  70                  75                  80
Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn
                85                  90                  95
Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp
            100                 105                 110
Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala
        115                 120                 125
Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe
    130                 135                 140
Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys
145                 150                 155                 160
Val Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn
                165                 170                 175
Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile
            180                 185                 190
```

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


<210> 17
<211> 328
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment from fusion 3

<400> 17
Phe Ala His His Asn Glu Asp Leu Gly Asn Glu Glu Gly Glu Glu Ile
 1               5                  10                  15
Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp
            20                  25                  30
Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser
        35                  40                  45
Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser
    50                  55                  60
Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly Ile Met Gln
65                  70                  75                  80
Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe Ser Asp Ser
                85                  90                  95
Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn Tyr Phe Tyr
            100                 105                 110
Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp Thr Ser Asp
        115                 120                 125
Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn Ile Tyr
    130                 135                 140
Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly Glu Asp Val
145                 150                 155                 160
Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp Ile Tyr Asp
                165                 170                 175
Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu Thr Lys Lys
            180                 185                 190
Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr Tyr Phe Asp
        195                 200                 205
Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu Asn Asn Asn
    210                 215                 220
Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr Ile Asn Ile
225                 230                 235                 240
Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met Gln Ile Gly
```

245 250 255
Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His Gln Asn Thr
260 265 270
Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr Gly Trp Leu
275 280 285
Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile Ala Ala
290 295 300
Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp Pro Asp
305 310 315 320
Thr Ala Gln Leu Val Ile Ser Glu
325

<210> 18
<211> 490
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment from fusion 4

<400> 18
Gly Glu Thr Ile Ile Asp Asp Lys Asn Tyr Tyr Phe Asn Gln Ser Gly
1 5 10 15
Val Leu Gln Thr Gly Val Phe Ser Thr Glu Asp Gly Phe Lys Tyr Phe
20 25 30
Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly Glu Ala Ile Asp
35 40 45
Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr Tyr Phe Asp Asp
50 55 60
Asn Tyr Arg Gly Ala Val Glu Trp Lys Glu Leu Asp Gly Glu Met His
65 70 75 80
Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly Leu Asn Gln Ile
85 90 95
Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val Met Gln Lys Gly
100 105 110
Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly Val
115 120 125
Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe Ala
130 135 140
Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly Phe
145 150 155 160
Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu Glu Gly Glu
165 170 175
Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr
180 185 190
Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp
195 200 205
Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly
210 215 220
Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly Ile
225 230 235 240
Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe Ser
245 250 255
Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn Tyr
260 265 270
Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp Thr
275 280 285
Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn
290 295 300
Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly Glu
305 310 315 320
Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp Ile
325 330 335
Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu Thr
340 345 350
Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr Tyr
355 360 365

```
Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu Asn
    370                 375                 380
Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr Ile
385                 390                 395                 400
Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met Gln
                405                 410                 415
Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His Gln
            420                 425                 430
Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr Gly
        435                 440                 445
Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile
    450                 455                 460
Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp
465                 470                 475                 480
Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
                485                 490


<210> 19
<211> 379
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment from fusion 5

<400> 19
Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly
 1                  5                  10                  15
Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe
            20                  25                  30
Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly
        35                  40                  45
Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu Glu Gly
    50                  55                  60
Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr
65                  70                  75                  80
Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu
                85                  90                  95
Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile
            100                 105                 110
Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly
        115                 120                 125
Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe
    130                 135                 140
Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn
145                 150                 155                 160
Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp
                165                 170                 175
Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp
            180                 185                 190
Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly
        195                 200                 205
Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp
    210                 215                 220
Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu
225                 230                 235                 240
Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr
                245                 250                 255
Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu
            260                 265                 270
Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr
        275                 280                 285
Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met
    290                 295                 300
Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His
305                 310                 315                 320
Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr
```

325 330 335
Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr
340 345 350
Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe
355 360 365
Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
370 375

<210> 20
<211> 3339
<212> DNA
<213> Artificial Sequence

<220>
<223> nucleotide sequence of F54 Gly fusion protein

<400> 20
atggcaaccg gttggcagac catcgatggc aaaaaatatt attttaatac caacaccgca 60
attgcaagca ccggctatac cattatcaac ggcaaacact tttattttaa caccgacggc 120
attatgcaga ttggtgtgtt taaaggtccg aacggctttg aatactttgc accggcaaat 180
accgatgcca ataatattga aggccaggcc attctgtatc agaatgaatt tctgaccctg 240
aacggcaaaa aatactactt tggcagcgat agcaaagcag ttaccggttg gcgcatcatc 300
aacaataaga aatattactt caacccgaat aatgcaattg cagcaattca tctgtgcacc 360
attaacaacg acaaatatta tttcagctat gacggtattc tgcagaatgg ctacattacc 420
atcgaacgca acaactttta tttcgatgcc aacaacgaaa gcaaaatggt gaccggtgtt 480
ttcaaaggcc ctaatggttt tgagtatttc gctccggcaa acacccataa taacaacatt 540
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His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys
        35   40   45
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
    50   55   60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65   70   75   80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
                85   90   95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
            100   105   110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
        115   120   125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
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Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val
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Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu
            180   185   190
Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val
        195   200   205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
    210   215   220
Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
225   230   235   240
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
                245   250   255
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
            260   265   270
Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly
        275   280   285
Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe
    290   295   300
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu
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Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly
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Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr
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Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser
    370   375   380
Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp
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Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr
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Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn
    450                 455                 460
Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys
465                 470                 475                 480
Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile
                485                 490                 495
Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn
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Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg
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Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys
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Gly Gly Thr Gly Phe Val Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn
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    610                 615                 620
Lys Asn Tyr Tyr Phe Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe
625                 630                 635                 640
Ser Thr Glu Asp Gly Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp
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Glu Asn Leu Glu Gly Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile
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Asp Glu Asn Ile Tyr Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu
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Trp Lys Glu Leu Asp Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly
    690                 695                 700
Lys Ala Phe Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe
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Lys His Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu
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Ile Asp Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile
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Gly Val Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn
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Glu Asp Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile
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Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala
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Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp
            820                 825                 830
Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly
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Gln Tyr Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr
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Gly Val Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly
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Ile Val Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe
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Ala Pro Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu
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Tyr Ser Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu
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Arg Thr Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu
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Asp Gly Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe
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Glu Gly Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys
1060 1065 1070
Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile
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<212> DNA
<213> Artificial Sequence

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<223> nucleotide sequence of F54 New fusion protein

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Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65   70   75   80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
                85   90   95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
            100   105   110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
        115   120   125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
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Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val
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Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His
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            180   185   190
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        195   200   205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
    210   215   220
Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
225   230   235   240
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
                245   250   255
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
            260   265   270
Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly
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Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser
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385                 390                 395                 400
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Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly
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Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr
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Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly
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Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val
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Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp
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        755                 760                 765
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Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn
785                 790                 795                 800
Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys
                805                 810                 815
Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu
            820                 825                 830
Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn
        835                 840                 845
Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val
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Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln
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1010 1015 1020
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Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu
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His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys
        35   40   45
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
    50   55   60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65   70   75   80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
                85   90   95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
            100   105   110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
        115   120   125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
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Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His
                165   170   175
Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu
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Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val

195 200 205

Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn

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Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
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Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile

245 250 255

Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr

260 265 270

Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly

275 280 285

Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe

290 295 300

Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu
305 310 315 320

Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly

325 330 335

Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys

340 345 350

Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr

355 360 365

Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser

370 375 380

Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp
385 390 395 400

Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr

405 410 415

Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile

420 425 430

Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe

435 440 445

Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn

450 455 460

Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys
465 470 475 480

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

485 490 495

Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn

500 505 510

Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg

515 520 525

Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys

530 535 540

Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met
545 550 555 560

Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly

565 570 575

Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Val Ser Gly Leu

580 585 590

Ile Tyr Ile Asn Asp Ser Leu Tyr Tyr Phe Lys Pro Pro Val Asn Asn

595 600 605

Leu Ile Thr Gly Phe Val Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn

610 615 620

Pro Ile Asn Gly Gly Ala Ala Ser Ile Gly Glu Thr Ile Ile Asp Asp
625 630 635 640

Lys Asn Tyr Tyr Phe Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe

645 650 655

Ser Thr Glu Asp Gly Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp

660 665 670

Glu Asn Leu Glu Gly Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile

675 680 685

Asp Glu Asn Ile Tyr Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu

690 695 700

Trp Lys Glu Leu Asp Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly
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Lys Ala Phe Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe

725 730 735

Asn Ser Asp Gly Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn

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Gly Val Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn
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                805                 810                 815
Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala
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Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp
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Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly
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Gln Tyr Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr
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Arg Thr Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu
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Asn Gly Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe
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Asp Gly Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe
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Glu Gly Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys
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Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile
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Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
    50   55   60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65   70   75   80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
                85   90   95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
            100   105   110
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Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val
        195                 200                 205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
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Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
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Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
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Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
            260                 265                 270
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            340                 345                 350
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            500                 505                 510
Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg
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            580                 585                 590
Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val Met
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Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp
    610                 615                 620
Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe
625                 630                 635                 640
Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu
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Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu
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Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala
705                 710                 715                 720
Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp
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Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe
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Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp
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Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val
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Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val
785                 790                 795                 800
Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg
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Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr
            820                 825                 830
Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn
        835                 840                 845
Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile
    850                 855                 860
Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser
865                 870                 875                 880
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Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly
            900                 905                 910
Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe
        915                 920                 925
Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn
    930                 935                 940
Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp
945                 950                 955                 960
Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr
                965                 970                 975
Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu His His His
            980                 985                 990
His His His
        995


<210> 28
<211> 593
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment of F54 Gly

<400> 28
Met Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn
 1               5                  10                  15
Thr Asn Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys
            20                  25                  30
His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys
        35                  40                  45
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
    50                  55                  60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65                  70                  75                  80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
                85                  90                  95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
            100                 105                 110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
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        115                 120                 125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
    130                 135                 140
Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val
145                 150                 155                 160
Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His
                165                 170                 175
Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu
            180                 185                 190
Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val
        195                 200                 205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
    210                 215                 220
Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
225                 230                 235                 240
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
                245                 250                 255
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
            260                 265                 270
Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly
        275                 280                 285
Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe
    290                 295                 300
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu
305                 310                 315                 320
Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly
                325                 330                 335
Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys
            340                 345                 350
Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr
        355                 360                 365
Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser
    370                 375                 380
Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp
385                 390                 395                 400
Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr
                405                 410                 415
Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile
            420                 425                 430
Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe
        435                 440                 445
Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn
    450                 455                 460
Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys
465                 470                 475                 480
Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile
                485                 490                 495
Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn
            500                 505                 510
Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg
        515                 520                 525
Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys
    530                 535                 540
Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met
545                 550                 555                 560
Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly
                565                 570                 575
Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Pro Gly Ile Tyr
            580                 585                 590
Gly
```

<210> 29
<211> 589
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment of F54 New

<400> 29
Met Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn
 1   5   10   15
Thr Asn Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys
            20   25   30
His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys
        35   40   45
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
    50   55   60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65   70   75   80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
                85   90   95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
            100   105   110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
        115   120   125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
    130   135   140
Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val
145   150   155   160
Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His
                165   170   175
Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu
            180   185   190
Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val
        195   200   205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
    210   215   220
Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
225   230   235   240
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
                245   250   255
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
            260   265   270
Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly
        275   280   285
Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe
    290   295   300
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu
305   310   315   320
Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly
                325   330   335
Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys
            340   345   350
Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr
        355   360   365
Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser
    370   375   380
Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp
385   390   395   400
Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr
                405   410   415
Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile
            420   425   430
Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe
        435   440   445
Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn
    450   455   460
Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys
465   470   475   480
Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile
                485   490   495
Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn
            500   505   510

Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg
515 520 525
Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys
530 535 540
Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met
545 550 555 560
Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly
565 570 575
Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Val
580 585

<210> 30
<211> 589
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment of F5 ToxB

<400> 30
Met Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn
1 5 10 15
Thr Asn Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys
20 25 30
His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys
35 40 45
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
50 55 60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65 70 75 80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
85 90 95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
100 105 110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
115 120 125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
130 135 140
Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val
145 150 155 160
Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His
165 170 175
Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu
180 185 190
Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val
195 200 205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
210 215 220
Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
225 230 235 240
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
245 250 255
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
260 265 270
Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly
275 280 285
Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe
290 295 300
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu
305 310 315 320
Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly
325 330 335
Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys
340 345 350
Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr
355 360 365
Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser

370 375 380
Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp
385 390 395 400
Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr
405 410 415
Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile
420 425 430
Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe
435 440 445
Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn
450 455 460
Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys
465 470 475 480
Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile
485 490 495
Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn
500 505 510
Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg
515 520 525
Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys
530 535 540
Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met
545 550 555 560
Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly
565 570 575
Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Val
580 585

<210> 31
<211> 589
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin A fragment of F52 New

<400> 31
Met Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn
1 5 10 15
Thr Asn Thr Ala Ile Ala Ser Thr Gly Tyr Thr Ile Ile Asn Gly Lys
20 25 30
His Phe Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys
35 40 45
Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn
50 55 60
Asn Ile Glu Gly Gln Ala Ile Leu Tyr Gln Asn Glu Phe Leu Thr Leu
65 70 75 80
Asn Gly Lys Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly
85 90 95
Trp Arg Ile Ile Asn Asn Lys Lys Tyr Tyr Phe Asn Pro Asn Asn Ala
100 105 110
Ile Ala Ala Ile His Leu Cys Thr Ile Asn Asn Asp Lys Tyr Tyr Phe
115 120 125
Ser Tyr Asp Gly Ile Leu Gln Asn Gly Tyr Ile Thr Ile Glu Arg Asn
130 135 140
Asn Phe Tyr Phe Asp Ala Asn Asn Glu Ser Lys Met Val Thr Gly Val
145 150 155 160
Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His
165 170 175
Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln Asn Lys Phe Leu
180 185 190
Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp Ser Lys Ala Val
195 200 205
Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn
210 215 220
Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
225 230 235 240

Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
245 250 255
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe Ile Ala Ser Thr
260 265 270
Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe Asn Thr Asp Gly
275 280 285
Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe
290 295 300
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Leu
305 310 315 320
Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Gly
325 330 335
Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile Asp Gly Lys Lys
340 345 350
Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr Gly Trp Gln Thr
355 360 365
Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ser Ile Ala Ser
370 375 380
Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr Phe Asn Thr Asp
385 390 395 400
Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp Gly Phe Glu Tyr
405 410 415
Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile
420 425 430
Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn Ile Tyr Tyr Phe
435 440 445
Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr Ile Asp Gly Asn
450 455 460
Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala Asn Gly Tyr Lys
465 470 475 480
Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly Leu Pro Gln Ile
485 490 495
Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe Ala Pro Ala Asn
500 505 510
Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg
515 520 525
Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly Asn Asn Ser Lys
530 535 540
Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val Tyr Tyr Phe Met
545 550 555 560
Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe Glu Ile Asp Gly
565 570 575
Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala Val
580 585

<210> 32
<211> 513
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment of F54Gly

<400> 32
Thr Gly Phe Val Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn Pro Ile
1 5 10 15
Asn Gly Gly Ala Ala Ser Ile Gly Glu Thr Ile Ile Asp Asp Lys Asn
20 25 30
Tyr Tyr Phe Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe Ser Thr
35 40 45
Glu Asp Gly Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn
50 55 60
Leu Glu Gly Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu
65 70 75 80
Asn Ile Tyr Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys
85 90 95
Glu Leu Asp Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala

100 105 110
Phe Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser
115 120 125
Asp Gly Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His
130 135 140
Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp
145 150 155 160
Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val
165 170 175
Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp
180 185 190
Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn
195 200 205
Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val
210 215 220
Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp
225 230 235 240
Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr
245 250 255
Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn
260 265 270
Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val
275 280 285
Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val
290 295 300
Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro
305 310 315 320
Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser
325 330 335
Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr
340 345 350
Thr Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys
355 360 365
Tyr Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu
370 375 380
Ile Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr
385 390 395 400
Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly
405 410 415
Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe
420 425 430
Gly Glu Asp Gly Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly
435 440 445
Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly
450 455 460
Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr
465 470 475 480
Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp
485 490 495
Gly Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser
500 505 510
Glu

<210> 33
<211> 513
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment of F54 New

<400> 33
Thr Gly Phe Val Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn Pro Ile
1 5 10 15
Asn Gly Gly Ala Ala Ser Ile Gly Glu Thr Ile Ile Asp Asp Lys Asn
20 25 30

```
Tyr Tyr Phe Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe Ser Thr
        35                  40                  45
Glu Asp Gly Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn
    50                  55                  60
Leu Glu Gly Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu
65                  70                  75                  80
Asn Ile Tyr Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys
                85                  90                  95
Glu Leu Asp Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala
            100                 105                 110
Phe Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser
        115                 120                 125
Asp Gly Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His
    130                 135                 140
Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp
145                 150                 155                 160
Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val
                165                 170                 175
Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp
            180                 185                 190
Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn
        195                 200                 205
Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val
    210                 215                 220
Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp
225                 230                 235                 240
Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr
                245                 250                 255
Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn
            260                 265                 270
Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val
        275                 280                 285
Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val
    290                 295                 300
Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro
305                 310                 315                 320
Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser
                325                 330                 335
Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr
            340                 345                 350
Thr Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys
        355                 360                 365
Tyr Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu
    370                 375                 380
Ile Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr
385                 390                 395                 400
Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly
                405                 410                 415
Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe
            420                 425                 430
Gly Glu Asp Gly Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly
        435                 440                 445
Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly
    450                 455                 460
Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr
465                 470                 475                 480
Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp
                485                 490                 495
Gly Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser
            500                 505                 510
Glu
```

<210> 34
<211> 534
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment of F5 ToxB

<400> 34
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Ser Gly Leu Ile Tyr Ile Asn Asp Ser Leu Tyr Tyr Phe Lys Pro Pro
 1               5                  10                  15
Val Asn Asn Leu Ile Thr Gly Phe Val Thr Val Gly Asp Asp Lys Tyr
            20                  25                  30
Tyr Phe Asn Pro Ile Asn Gly Gly Ala Ala Ser Ile Gly Glu Thr Ile
        35                  40                  45
Ile Asp Asp Lys Asn Tyr Tyr Phe Asn Gln Ser Gly Val Leu Gln Thr
    50                  55                  60
Gly Val Phe Ser Thr Glu Asp Gly Phe Lys Tyr Phe Ala Pro Ala Asn
65                  70                  75                  80
Thr Leu Asp Glu Asn Leu Glu Gly Glu Ala Ile Asp Phe Thr Gly Lys
                85                  90                  95
Leu Ile Ile Asp Glu Asn Ile Tyr Tyr Phe Asp Asp Asn Tyr Arg Gly
            100                 105                 110
Ala Val Glu Trp Lys Glu Leu Asp Gly Glu Met His Tyr Phe Ser Pro
        115                 120                 125
Glu Thr Gly Lys Ala Phe Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys
    130                 135                 140
Tyr Tyr Phe Asn Ser Asp Gly Val Met Gln Lys Gly Phe Val Ser Ile
145                 150                 155                 160
Asn Asp Asn Lys His Tyr Phe Asp Asp Ser Gly Val Met Lys Val Gly
                165                 170                 175
Tyr Thr Glu Ile Asp Gly Lys His Phe Tyr Phe Ala Glu Asn Gly Glu
            180                 185                 190
Met Gln Ile Gly Val Phe Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala
        195                 200                 205
His His Asn Glu Asp Leu Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr
    210                 215                 220
Ser Gly Ile Leu Asn Phe Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser
225                 230                 235                 240
Phe Thr Ala Val Val Gly Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr
                245                 250                 255
Tyr Phe Asp Glu Asp Thr Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile
            260                 265                 270
Asn Asp Gly Gln Tyr Tyr Phe Asn Asp Asp Gly Ile Met Gln Val Gly
        275                 280                 285
Phe Val Thr Ile Asn Asp Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile
    290                 295                 300
Ile Glu Ser Gly Val Gln Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp
305                 310                 315                 320
Asp Asn Gly Ile Val Gln Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr
                325                 330                 335
Lys Tyr Phe Ala Pro Ala Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln
            340                 345                 350
Ala Val Glu Tyr Ser Gly Leu Val Arg Val Gly Glu Asp Val Tyr Tyr
        355                 360                 365
Phe Gly Glu Thr Tyr Thr Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu
    370                 375                 380
Asn Glu Ser Asp Lys Tyr Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys
385                 390                 395                 400
Lys Gly Ile Asn Leu Ile Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys
                405                 410                 415
Gly Ile Met Arg Thr Gly Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr
            420                 425                 430
Phe Asn Glu Asn Gly Glu Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp
        435                 440                 445
Lys Met Phe Tyr Phe Gly Glu Asp Gly Val Met Gln Ile Gly Val Phe
    450                 455                 460
Asn Thr Pro Asp Gly Phe Lys Tyr Phe Ala His Gln Asn Thr Leu Asp
465                 470                 475                 480
Glu Asn Phe Glu Gly Glu Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu
                485                 490                 495
Asp Glu Lys Arg Tyr Tyr Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly
```

500 505 510
Ser Val Ile Ile Asp Gly Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala
515 520 525
Gln Leu Val Ile Ser Glu
530

<210> 35
<211> 400
<212> PRT
<213> Artificial Sequence

<220>
<223> toxin B fragment of F52 New

<400> 35
Lys Gly Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp
1 5 10 15
Gly Val Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr
20 25 30
Phe Asp Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly
35 40 45
Lys His Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe
50 55 60
Asn Thr Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu
65 70 75 80
Gly Asn Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe
85 90 95
Asn Asn Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly
100 105 110
Trp Lys Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr
115 120 125
Ala Glu Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr
130 135 140
Phe Asn Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp
145 150 155 160
Lys Val Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln
165 170 175
Asn Ile Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln
180 185 190
Ile Gly Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala
195 200 205
Asn Thr Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly
210 215 220
Leu Val Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr
225 230 235 240
Ile Glu Thr Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr
245 250 255
Tyr Phe Asn Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile
260 265 270
Asp Asp Ile Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly
275 280 285
Leu Ile Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu
290 295 300
Met Gln Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly
305 310 315 320
Glu Asp Gly Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe
325 330 335
Lys Tyr Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu
340 345 350
Ser Ile Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr
355 360 365
Phe Thr Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly
370 375 380
Glu Glu Tyr Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
385 390 395 400

<210> 36
<211> 958
<212> PRT
<213> Artificial Sequence

<220>
<223> C-TAB.G5 fusion

<400> 36

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Met Val Thr Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala
 1               5                  10                  15
Pro Ala Asn Thr His Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr
            20                  25                  30
Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn
        35                  40                  45
Asp Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr
    50                  55                  60
Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile
65                  70                  75                  80
Asp Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr
                85                  90                  95
Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr
            100                 105                 110
Phe Ile Ala Ser Thr Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr
        115                 120                 125
Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn
    130                 135                 140
Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr His Asn Asn Asn Ile Glu
145                 150                 155                 160
Gly Gln Ala Ile Leu Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys
                165                 170                 175
Lys Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr
            180                 185                 190
Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val
        195                 200                 205
Thr Gly Trp Gln Thr Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn
    210                 215                 220
Thr Ser Ile Ala Ser Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe
225                 230                 235                 240
Tyr Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro
                245                 250                 255
Asp Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile
            260                 265                 270
Glu Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp
        275                 280                 285
Asn Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val
    290                 295                 300
Thr Ile Asp Gly Asn Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly
305                 310                 315                 320
Ala Asn Gly Tyr Lys Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn
                325                 330                 335
Gly Leu Pro Gln Ile Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr
            340                 345                 350
Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile
        355                 360                 365
Arg Tyr Gln Asn Arg Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe
    370                 375                 380
Gly Asn Asn Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys
385                 390                 395                 400
Val Tyr Tyr Phe Met Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu
                405                 410                 415
Phe Glu Ile Asp Gly Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys
            420                 425                 430
Ala Pro Gly Ile Tyr Gly Arg Ser Met His Asn Leu Ile Thr Gly Phe
        435                 440                 445
Val Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn Pro Ile Asn Gly Gly
    450                 455                 460
Ala Ala Ser Ile Gly Glu Thr Ile Ile Asp Asp Lys Asn Tyr Tyr Phe
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465                 470                 475                 480
Asn Gln Ser Gly Val Leu Gln Thr Gly Val Phe Ser Thr Glu Asp Gly
                485                 490                 495
Phe Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly
            500                 505                 510
Glu Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr
        515                 520                 525
Tyr Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys Glu Leu Asp
    530                 535                 540
Gly Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly
545                 550                 555                 560
Leu Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val
                565                 570                 575
Met Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp
            580                 585                 590
Asp Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His
        595                 600                 605
Phe Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr
    610                 615                 620
Glu Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn
625                 630                 635                 640
Glu Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn
                645                 650                 655
Lys Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys
            660                 665                 670
Asp Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu
        675                 680                 685
Ala Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn
    690                 695                 700
Asp Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val
705                 710                 715                 720
Phe Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile
                725                 730                 735
Asp Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly
            740                 745                 750
Val Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr
        755                 760                 765
Val Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val
    770                 775                 780
Arg Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu
785                 790                 795                 800
Thr Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe
                805                 810                 815
Asn Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp
            820                 825                 830
Ile Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile
        835                 840                 845
Ser Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln
    850                 855                 860
Phe Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp
865                 870                 875                 880
Gly Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr
                885                 890                 895
Phe Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile
            900                 905                 910
Asn Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr
        915                 920                 925
Asp Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu
    930                 935                 940
Tyr Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
945                 950                 955
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<210> 37
<211> 957
<212> PRT
<213> Artificial Sequence

<220>
<223> C-TAB.G5.1 fusion

<400> 37
Val Thr Gly Val Phe Lys Gly Pro Asn Gly Phe Glu Tyr Phe Ala Pro
 1   5   10   15
Ala Asn Thr His Asn Asn Asn Ile Glu Gly Gln Ala Ile Val Tyr Gln
            20   25   30
Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys Tyr Tyr Phe Asp Asn Asp
        35   40   45
Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr
    50   55   60
Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly Trp Gln Thr Ile Asp
65   70   75   80
Gly Lys Lys Tyr Tyr Phe Asn Leu Asn Thr Ala Glu Ala Ala Thr Gly
                85   90   95
Trp Gln Thr Ile Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Phe
            100   105   110
Ile Ala Ser Thr Gly Tyr Thr Ser Ile Asn Gly Lys His Phe Tyr Phe
        115   120   125
Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asn Gly
    130   135   140
Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly
145   150   155   160
Gln Ala Ile Leu Tyr Gln Asn Lys Phe Leu Thr Leu Asn Gly Lys Lys
                165   170   175
Tyr Tyr Phe Gly Ser Asp Ser Lys Ala Val Thr Gly Leu Arg Thr Ile
            180   185   190
Asp Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr Ala Val Ala Val Thr
        195   200   205
Gly Trp Gln Thr Ile Asn Gly Lys Lys Tyr Tyr Phe Asn Thr Asn Thr
    210   215   220
Ser Ile Ala Ser Thr Gly Tyr Thr Ile Ile Ser Gly Lys His Phe Tyr
225   230   235   240
Phe Asn Thr Asp Gly Ile Met Gln Ile Gly Val Phe Lys Gly Pro Asp
                245   250   255
Gly Phe Glu Tyr Phe Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu
            260   265   270
Gly Gln Ala Ile Arg Tyr Gln Asn Arg Phe Leu Tyr Leu His Asp Asn
        275   280   285
Ile Tyr Tyr Phe Gly Asn Asn Ser Lys Ala Ala Thr Gly Trp Val Thr
    290   295   300
Ile Asp Gly Asn Arg Tyr Tyr Phe Glu Pro Asn Thr Ala Met Gly Ala
305   310   315   320
Asn Gly Tyr Lys Thr Ile Asp Asn Lys Asn Phe Tyr Phe Arg Asn Gly
                325   330   335
Leu Pro Gln Ile Gly Val Phe Lys Gly Ser Asn Gly Phe Glu Tyr Phe
            340   345   350
Ala Pro Ala Asn Thr Asp Ala Asn Asn Ile Glu Gly Gln Ala Ile Arg
        355   360   365
Tyr Gln Asn Arg Phe Leu His Leu Leu Gly Lys Ile Tyr Tyr Phe Gly
    370   375   380
Asn Asn Ser Lys Ala Val Thr Gly Trp Gln Thr Ile Asn Gly Lys Val
385   390   395   400
Tyr Tyr Phe Met Pro Asp Thr Ala Met Ala Ala Ala Gly Gly Leu Phe
                405   410   415
Glu Ile Asp Gly Val Ile Tyr Phe Phe Gly Val Asp Gly Val Lys Ala
            420   425   430
Pro Gly Ile Tyr Gly Arg Ser Met His Asn Leu Ile Thr Gly Phe Val
        435   440   445
Thr Val Gly Asp Asp Lys Tyr Tyr Phe Asn Pro Ile Asn Gly Gly Ala
    450   455   460
Ala Ser Ile Gly Glu Thr Ile Ile Asp Asp Lys Asn Tyr Tyr Phe Asn
465   470   475   480
Gln Ser Gly Val Leu Gln Thr Gly Val Phe Ser Thr Glu Asp Gly Phe
                485   490   495
Lys Tyr Phe Ala Pro Ala Asn Thr Leu Asp Glu Asn Leu Glu Gly Glu
            500   505   510

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Ala Ile Asp Phe Thr Gly Lys Leu Ile Ile Asp Glu Asn Ile Tyr Tyr
        515                 520                 525
Phe Asp Asp Asn Tyr Arg Gly Ala Val Glu Trp Lys Glu Leu Asp Gly
    530                 535                 540
Glu Met His Tyr Phe Ser Pro Glu Thr Gly Lys Ala Phe Lys Gly Leu
545                 550                 555                 560
Asn Gln Ile Gly Asp Tyr Lys Tyr Tyr Phe Asn Ser Asp Gly Val Met
                565                 570                 575
Gln Lys Gly Phe Val Ser Ile Asn Asp Asn Lys His Tyr Phe Asp Asp
            580                 585                 590
Ser Gly Val Met Lys Val Gly Tyr Thr Glu Ile Asp Gly Lys His Phe
        595                 600                 605
Tyr Phe Ala Glu Asn Gly Glu Met Gln Ile Gly Val Phe Asn Thr Glu
    610                 615                 620
Asp Gly Phe Lys Tyr Phe Ala His His Asn Glu Asp Leu Gly Asn Glu
625                 630                 635                 640
Glu Gly Glu Glu Ile Ser Tyr Ser Gly Ile Leu Asn Phe Asn Asn Lys
                645                 650                 655
Ile Tyr Tyr Phe Asp Asp Ser Phe Thr Ala Val Val Gly Trp Lys Asp
            660                 665                 670
Leu Glu Asp Gly Ser Lys Tyr Tyr Phe Asp Glu Asp Thr Ala Glu Ala
        675                 680                 685
Tyr Ile Gly Leu Ser Leu Ile Asn Asp Gly Gln Tyr Tyr Phe Asn Asp
    690                 695                 700
Asp Gly Ile Met Gln Val Gly Phe Val Thr Ile Asn Asp Lys Val Phe
705                 710                 715                 720
Tyr Phe Ser Asp Ser Gly Ile Ile Glu Ser Gly Val Gln Asn Ile Asp
                725                 730                 735
Asp Asn Tyr Phe Tyr Ile Asp Asp Asn Gly Ile Val Gln Ile Gly Val
            740                 745                 750
Phe Asp Thr Ser Asp Gly Tyr Lys Tyr Phe Ala Pro Ala Asn Thr Val
        755                 760                 765
Asn Asp Asn Ile Tyr Gly Gln Ala Val Glu Tyr Ser Gly Leu Val Arg
    770                 775                 780
Val Gly Glu Asp Val Tyr Tyr Phe Gly Glu Thr Tyr Thr Ile Glu Thr
785                 790                 795                 800
Gly Trp Ile Tyr Asp Met Glu Asn Glu Ser Asp Lys Tyr Tyr Phe Asn
                805                 810                 815
Pro Glu Thr Lys Lys Ala Cys Lys Gly Ile Asn Leu Ile Asp Asp Ile
            820                 825                 830
Lys Tyr Tyr Phe Asp Glu Lys Gly Ile Met Arg Thr Gly Leu Ile Ser
        835                 840                 845
Phe Glu Asn Asn Asn Tyr Tyr Phe Asn Glu Asn Gly Glu Met Gln Phe
    850                 855                 860
Gly Tyr Ile Asn Ile Glu Asp Lys Met Phe Tyr Phe Gly Glu Asp Gly
865                 870                 875                 880
Val Met Gln Ile Gly Val Phe Asn Thr Pro Asp Gly Phe Lys Tyr Phe
                885                 890                 895
Ala His Gln Asn Thr Leu Asp Glu Asn Phe Glu Gly Glu Ser Ile Asn
            900                 905                 910
Tyr Thr Gly Trp Leu Asp Leu Asp Glu Lys Arg Tyr Tyr Phe Thr Asp
        915                 920                 925
Glu Tyr Ile Ala Ala Thr Gly Ser Val Ile Ile Asp Gly Glu Glu Tyr
    930                 935                 940
Tyr Phe Asp Pro Asp Thr Ala Gln Leu Val Ile Ser Glu
945                 950                 955
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