eolf-seql
SEQUENCE LISTING

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Asn Lys Gln Ala Tyr Glu Glu Ile Ser Lys Glu His Leu Ala Val Tyr
            420                 425                 430

Lys Ile Gln Met Cys Lys Ser Val Lys Ala Pro Gly Ile Cys Ile Asp
        435                 440                 445

Val Asp Asn Glu Asp Leu Phe Phe Ile Ala Asp Lys Asn Ser Phe Ser
    450                 455                 460

Asp Asp Leu Ser Lys Asn Glu Arg Ile Glu Tyr Asn Thr Gln Ser Asn
465                 470                 475                 480

Tyr Ile Glu Asn Asp Phe Pro Ile Asn Glu Leu Ile Leu Asp Thr Asp
                485                 490                 495
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Leu Ile Ser Lys Ile Glu Leu Pro Ser Glu Asn Thr Glu Ser Leu Thr
            500                 505                 510

Asp Phe Asn Val Asp Val Pro Val Tyr Glu Lys Gln Pro Ala Ile Lys
        515                 520                 525

Lys Ile Phe Thr Asp Glu Asn Thr Ile Phe Gln Tyr Leu Tyr Ser Gln
    530                 535                 540

Thr Phe Pro Leu Asp Ile Arg Asp Ile Ser Leu Thr Ser Ser Phe Asp
545                 550                 555                 560

Asp Ala Leu Leu Phe Ser Asn Lys Val Tyr Ser Phe Phe Ser Met Asp
                565                 570                 575

Tyr Ile Lys Thr Ala Asn Lys Val Val Glu Ala Gly Leu Phe Ala Gly
            580                 585                 590

Trp Val Lys Gln Ile Val Asn Asp Phe Val Ile Glu Ala Asn Lys Ser
        595                 600                 605

Asn Thr Met Asp Lys Ile Ala Asp Ile Ser Leu Ile Val Pro Tyr Ile
    610                 615                 620

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

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

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

Asp Asn Lys Asn Lys Ile Ile Lys Thr Ile Asp Asn Ala Leu Thr Lys
        675                 680                 685

Arg Asn Glu Lys Trp Ser Asp Met Tyr Gly Leu Ile Val Ala Gln Trp
    690                 695                 700

Leu Ser Thr Val Asn Thr Gln Phe Tyr Thr Ile Lys Glu Gly Met Tyr
705                 710                 715                 720

Lys Ala Leu Asn Tyr Gln Ala Gln Ala Leu Glu Glu Ile Ile Lys Tyr
                725                 730                 735

Arg Tyr Asn Ile Tyr Ser Glu Lys Glu Lys Ser Asn Ile Asn Ile Asp
            740                 745                 750
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Phe Asn Asp Ile Asn Ser Lys Leu Asn Glu Gly Ile Asn Gln Ala Ile
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Asp Asn Ile Asn Asn Phe Ile Asn Gly Cys Ser Val Ser Tyr Leu Met
    770                 775                 780

Lys Lys Met Ile Pro Leu Ala Val Glu Lys Leu Leu Asp Phe Asp Asn
785                 790                 795                 800

Thr Leu Lys Lys Asn Leu Leu Asn Tyr Ile Asp Glu Asn Lys Leu Tyr
                805                 810                 815

Leu Ile Gly Ser Ala Glu Tyr Glu Lys Ser Lys Val Asn Lys Tyr Leu
            820                 825                 830

Lys Thr Ile Met Pro Phe Asp Leu Ser Ile Tyr Thr Asn Asp Thr Ile
        835                 840                 845

Leu Ile Glu Met Phe Asn Lys Tyr Asn Ser Glu Ile Leu Asn Asn Ile
    850                 855                 860

Ile Leu Asn Leu Arg Tyr Lys Asp Asn Asn Leu Ile Asp Leu Ser Gly
865                 870                 875                 880

Tyr Gly Ala Lys Val Glu Val Tyr Asp Gly Val Glu Leu Asn Asp Lys
                885                 890                 895

Asn Gln Phe Lys Leu Thr Ser Ser Ala Asn Ser Lys Ile Arg Val Thr
            900                 905                 910

Gln Asn Gln Asn Ile Ile Phe Asn Ser Val Phe Leu Asp Phe Ser Val
        915                 920                 925

Ser Phe Trp Ile Arg Ile Pro Lys Tyr Lys Asn Asp Gly Ile Gln Asn
    930                 935                 940

Tyr Ile His Asn Glu Tyr Thr Ile Ile Asn Cys Met Lys Asn Asn Ser
945                 950                 955                 960

Gly Trp Lys Ile Ser Ile Arg Gly Asn Arg Ile Ile Trp Thr Leu Ile
                965                 970                 975

Asp Ile Asn Gly Lys Thr Lys Ser Val Phe Phe Glu Tyr Asn Ile Arg
            980                 985                 990

Glu Asp Ile Ser Glu Tyr Ile Asn  Arg Trp Phe Phe Val  Thr Ile Thr
        995                 1000                1005
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Asn Asn  Leu Asn Asn Ala Lys  Ile Tyr Ile Asn Gly  Lys Leu Glu
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Ser Asn  Thr Asp Ile Lys Asp  Ile Arg Glu Val Ile  Ala Asn Gly
    1025                 1030                 1035

Glu Ile  Ile Phe Lys Leu Asp  Gly Asp Ile Asp Arg  Thr Gln Phe
    1040                 1045                 1050

Ile Trp  Met Lys Tyr Phe Ser  Ile Phe Asn Thr Glu  Leu Ser Gln
    1055                 1060                 1065

Ser Asn  Ile Glu Glu Arg Tyr  Lys Ile Gln Ser Tyr  Ser Glu Tyr
    1070                 1075                 1080

Leu Lys  Asp Phe Trp Gly Asn  Pro Leu Met Tyr Asn  Lys Glu Tyr
    1085                 1090                 1095

Tyr Met  Phe Asn Ala Gly Asn  Lys Asn Ser Tyr Ile  Lys Leu Lys
    1100                 1105                 1110

Lys Asp  Ser Pro Val Gly Glu  Ile Leu Thr Arg Ser  Lys Tyr Asn
    1115                 1120                 1125

Gln Asn  Ser Lys Tyr Ile Asn  Tyr Arg Asp Leu Tyr  Ile Gly Glu
    1130                 1135                 1140

Lys Phe  Ile Ile Arg Arg Lys  Ser Asn Ser Gln Ser  Ile Asn Asp
    1145                 1150                 1155

Asp Ile  Val Arg Lys Glu Asp  Tyr Ile Tyr Leu Asp  Phe Phe Asn
    1160                 1165                 1170

Leu Asn  Gln Glu Trp Arg Val  Tyr Thr Tyr Lys Tyr  Phe Lys Lys
    1175                 1180                 1185

Glu Glu  Glu Lys Leu Phe Leu  Ala Pro Ile Ser Asp  Ser Asp Glu
    1190                 1195                 1200

Phe Tyr  Asn Thr Ile Gln Ile  Lys Glu Tyr Asp Glu  Gln Pro Thr
    1205                 1210                 1215

Tyr Ser  Cys Gln Leu Leu Phe  Lys Lys Asp Glu Glu  Ser Thr Asp
    1220                 1225                 1230

Glu Ile  Gly Leu Ile Gly Ile  His Arg Phe Tyr Glu  Ser Gly Ile
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Val Phe Glu Glu Tyr Lys Asp Tyr Phe Cys Ile Ser Lys Trp Tyr
1250 1255 1260

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Asn Trp Gln Phe Ile Pro Lys Asp Glu Gly Trp Thr Glu
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gaaataggag aagaattaat atatagactt gcaacagaca taccctttcc tgggaataac 360

aatactccaa ttaatacttt tgattttgat gtagatttta acagtgttga tgttaaaact 420

agacaaggta acaactgggt taaaactggt agtataaatc ctagtgttat aataactgga 480

cctagagaaa acattataga cccagaaact tctacgttta aattaactaa caatactttt 540

gcggcacaag aaggatttgg tgctttatca ataatttcaa tatcacctag atttatgcta 600

acatatagta atgcaactaa taatgtagga gagggtagat tttctaagtc tgaattttgc 660

atggatccaa tactaatttt aatgcatgaa cttaatcatg caatgcataa tttatatgga 720

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tataaggtga aattagagta tgcagaaata tatgcatttg gaggtccaac tatagacctt 840

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gctaaaagac ttaatagtat aactactgca aatccttcaa gctttaataa atatatagga 960

gaatataaac agaaacttat tagaaagtat agattcgtag tagaatcttc aggtgaagtt 1020

gcagtagatc gtaataagtt tgctgagtta tataaagaac ttacacaaat atttacagaa 1080

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cataatatta ttctagttgg tgaagtagat agattaaaag caaaagtaaa tgagagtttt 2520

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taa 3843

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Pro Glu Lys Ala Phe Arg Ile Ile Gly Asn Ile Trp Val Ile Pro Asp
35 40 45

Arg Phe Ser Arg Asp Ser Asn Pro Asn Leu Asn Lys Pro Pro Arg Val
50 55 60

Thr Ser Pro Lys Ser Gly Tyr Tyr Asp Pro Asn Tyr Leu Ser Thr Asp
65 70 75 80

Ser Glu Lys Asp Thr Phe Leu Lys Glu Ile Ile Lys Leu Phe Lys Arg
85 90 95

Ile Asn Ser Arg Glu Ile Gly Glu Glu Leu Ile Tyr Arg Leu Ala Thr
100 105 110

Asp Ile Pro Phe Pro Gly Asn Asn Asn Thr Pro Ile Asn Thr Phe Asp
115 120 125

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Phe Asp Val Asp Phe Asn Ser Val Asp Val Lys Thr Arg Gln Gly Asn
    130                 135                 140

Asn Trp Val Lys Thr Gly Ser Ile Asn Pro Ser Val Ile Ile Thr Gly
145                 150                 155                 160

Pro Arg Glu Asn Ile Ile Asp Pro Glu Thr Ser Thr Phe Lys Leu Thr
                165                 170                 175

Asn Asn Thr Phe Ala Ala Gln Glu Gly Phe Gly Ala Leu Ser Ile Ile
            180                 185                 190

Ser Ile Ser Pro Arg Phe Met Leu Thr Tyr Ser Asn Ala Thr Asn Asn
        195                 200                 205

Val Gly Glu Gly Arg Phe Ser Lys Ser Glu Phe Cys Met Asp Pro Ile
    210                 215                 220

Leu Ile Leu Met His Glu Leu Asn His Ala Met His Asn Leu Tyr Gly
225                 230                 235                 240

Ile Ala Ile Pro Asn Asp Gln Arg Ile Ser Ser Val Thr Ser Asn Ile
                245                 250                 255

Phe Tyr Ser Gln Tyr Lys Val Lys Leu Glu Tyr Ala Glu Ile Tyr Ala
            260                 265                 270

Phe Gly Gly Pro Thr Ile Asp Leu Ile Pro Lys Ser Ala Arg Lys Tyr
        275                 280                 285

Phe Glu Glu Lys Ala Leu Asp Tyr Tyr Arg Ser Ile Ala Lys Arg Leu
    290                 295                 300

Asn Ser Ile Thr Thr Ala Asn Pro Ser Ser Phe Asn Lys Tyr Ile Gly
305                 310                 315                 320

Glu Tyr Lys Gln Lys Leu Ile Arg Lys Tyr Arg Phe Val Val Glu Ser
                325                 330                 335

Ser Gly Glu Val Ala Val Asp Arg Asn Lys Phe Ala Glu Leu Tyr Lys
            340                 345                 350

Glu Leu Thr Gln Ile Phe Thr Glu Phe Asn Tyr Ala Lys Ile Tyr Asn
        355                 360                 365

Val Gln Asn Arg Lys Ile Tyr Leu Ser Asn Val Tyr Thr Pro Val Thr
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370 375 380

Ala Asn Ile Leu Asp Asp Asn Val Tyr Asp Ile Gln Asn Gly Phe Asn
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Ile Pro Lys Ser Asn Leu Asn Val Leu Phe Met Gly Gln Asn Leu Ser
405 410 415

Arg Asn Pro Ala Leu Arg Lys Val Asn Pro Glu Asn Met Leu Tyr Leu
420 425 430

Phe Thr Lys Phe Cys His Lys Ala Ile Asp Gly Arg Ser Leu Tyr Asn
435 440 445

Lys Thr Leu Asp Cys Arg Glu Leu Leu Val Lys Asn Thr Asp Leu Pro
450 455 460

Phe Ile Gly Asp Ile Ser Asp Ile Lys Thr Asp Ile Phe Leu Ser Lys
465 470 475 480

Asp Ile Asn Glu Glu Thr Glu Val Ile Asp Tyr Pro Asp Asn Val Ser
485 490 495

Val Asp Gln Val Ile Leu Ser Lys Asn Thr Ser Glu His Gly Gln Leu
500 505 510

Asp Leu Leu Tyr Pro Ile Ile Glu Gly Glu Ser Gln Val Leu Pro Gly
515 520 525

Glu Asn Gln Val Phe Tyr Asp Asn Arg Thr Gln Asn Val Asp Tyr Leu
530 535 540

Asn Ser Tyr Tyr Tyr Leu Glu Ser Gln Lys Leu Ser Asp Asn Val Glu
545 550 555 560

Asp Phe Thr Phe Thr Thr Ser Ile Glu Glu Ala Leu Asp Asn Ser Gly
565 570 575

Lys Val Tyr Thr Tyr Phe Pro Lys Leu Ala Asp Lys Val Asn Thr Gly
580 585 590

Val Gln Gly Gly Leu Phe Leu Met Trp Ala Asn Asp Val Val Glu Asp
595 600 605

Phe Thr Thr Asn Ile Leu Arg Lys Asp Thr Leu Asp Lys Ile Ser Asp
610 615 620

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Val Ser Ala Ile Ile Pro Tyr Ile Gly Pro Ala Leu Asn Ile Ser Asn
625                 630                 635                 640

Ser Val Arg Arg Gly Asn Phe Thr Glu Ala Phe Ala Val Thr Gly Val
                645                 650                 655

Thr Ile Leu Leu Glu Ala Phe Gln Glu Phe Thr Ile Pro Ala Leu Gly
            660                 665                 670

Ala Phe Val Ile Tyr Ser Lys Val Gln Glu Arg Asn Glu Ile Ile Lys
        675                 680                 685

Thr Ile Asp Asn Cys Leu Glu Gln Arg Ile Lys Arg Trp Lys Asp Ser
    690                 695                 700

Tyr Glu Trp Met Ile Gly Thr Trp Leu Ser Arg Ile Thr Thr Gln Phe
705                 710                 715                 720

Asn Asn Ile Ser Tyr Gln Met Tyr Asp Ser Leu Asn Tyr Gln Ala Asp
                725                 730                 735

Ala Ile Lys Asp Lys Ile Asp Leu Glu Tyr Lys Lys Tyr Ser Gly Ser
            740                 745                 750

Asp Lys Glu Asn Ile Lys Ser Gln Val Glu Asn Leu Lys Asn Ser Leu
        755                 760                 765

Asp Ile Lys Ile Ser Glu Ala Met Asn Asn Ile Asn Lys Phe Ile Arg
    770                 775                 780

Glu Cys Ser Val Thr Tyr Leu Phe Lys Asn Met Leu Pro Lys Val Ile
785                 790                 795                 800

Asp Glu Leu Asn Lys Phe Asp Leu Lys Thr Lys Thr Glu Leu Ile Asn
                805                 810                 815

Leu Ile Asp Ser His Asn Ile Ile Leu Val Gly Glu Val Asp Arg Leu
            820                 825                 830

Lys Ala Lys Val Asn Glu Ser Phe Glu Asn Thr Ile Pro Phe Asn Ile
        835                 840                 845

Phe Ser Tyr Thr Asn Asn Ser Leu Leu Lys Asp Ile Ile Asn Glu Tyr
    850                 855                 860

Phe Asn Ser Ile Asn Asp Ser Lys Ile Leu Ser Leu Gln Asn Lys Lys
865                 870                 875                 880
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Asn Ala Leu Val Asp Thr Ser Gly Tyr Asn Ala Glu Val Arg Leu Glu
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Gly Asp Val Gln Val Asn Thr Ile Tyr Thr Asn Asp Phe Lys Leu Ser
            900                 905                 910

Ser Ser Gly Asp Lys Ile Ile Val Asn Leu Asn Asn Asn Ile Leu Tyr
        915                 920                 925

Ser Ala Ile Tyr Glu Asn Ser Ser Val Ser Phe Trp Ile Lys Ile Ser
    930                 935                 940

Lys Asp Leu Thr Asn Ser His Asn Glu Tyr Thr Ile Ile Asn Ser Ile
945                 950                 955                 960

Lys Gln Asn Ser Gly Trp Lys Leu Cys Ile Arg Asn Gly Asn Ile Glu
                965                 970                 975

Trp Ile Leu Gln Asp Ile Asn Arg Lys Tyr Lys Ser Leu Ile Phe Asp
            980                 985                 990

Tyr Ser Glu Ser Leu Ser His Thr  Gly Tyr Thr Asn Lys  Trp Phe Phe
        995                 1000                1005

Val Thr  Ile Thr Asn Asn Ile  Met Gly Tyr Met Lys  Leu Tyr Ile
    1010                1015                1020

Asn Gly  Glu Leu Lys Gln Ser  Glu Arg Ile Glu Asp  Leu Asn Glu
    1025                1030                1035

Val Lys  Leu Asp Lys Thr Ile  Val Phe Gly Ile Asp  Glu Asn Ile
    1040                1045                1050

Asp Glu  Asn Gln Met Leu Trp  Ile Arg Asp Phe Asn  Ile Phe Ser
    1055                1060                1065

Lys Glu  Leu Ser Asn Glu Asp  Ile Asn Ile Val Tyr  Glu Gly Gln
    1070                1075                1080

Ile Leu  Arg Asn Val Ile Lys  Asp Tyr Trp Gly Asn  Pro Leu Lys
    1085                1090                1095

Phe Asp  Thr Glu Tyr Tyr Ile  Ile Asn Asp Asn Tyr  Ile Asp Arg
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Tyr Ile  Ala Pro Lys Ser Asn  Ile Leu Val Leu Val  Gln Tyr Pro
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Asp Arg Ser Lys Leu Tyr Thr Gly Asn Pro Ile Thr Ile Lys Ser
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Val Ser Asp Lys Asn Pro Tyr Ser Arg Ile Leu Asn Gly Asp Asn
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Ile Met Phe His Met Leu Tyr Asn Ser Gly Lys Tyr Met Ile Ile
1160 1165 1170

Arg Asp Thr Asp Thr Ile Tyr Ala Ile Glu Gly Arg Glu Cys Ser
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Lys Asn Cys Val Tyr Ala Leu Lys Leu Gln Ser Asn Leu Gly Asn
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Tyr Gly Ile Gly Ile Phe Ser Ile Lys Asn Ile Val Ser Gln Asn
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Lys Tyr Cys Ser Gln Ile Phe Ser Ser Phe Met Lys Asn Thr Met
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Leu Leu Ala Asp Ile Tyr Lys Pro Trp Arg Phe Ser Phe Glu Asn
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Ala Tyr Thr Pro Val Ala Val Thr Asn Tyr Glu Thr Lys Leu Leu
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Val Glu
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gaatgttctg taacatactt atttaaaaat atgctcccta aagtaattga tgaattaaat 2400

aagtttgatt taaaaactaa aacagaatta attaatctta tagatagtca taatattatt 2460

ctagttggtg aagtagatag attaaaagca aaagtaaatg agagttttga aaatacaata 2520

ccctttaata ttttttcata tactaataat tctttattaa aagatatgat taatgaatat 2580

ttcaatagta ttaatgattc aaaaattttg agcttacaaa ataaaaaaaa tactttgatg 2640

gatacatcag gatataacgc agaagtgaga gtagaaggca atgttcagct taatccaata 2700

tttccatttg actttaaatt aggtagttca ggggatgata gaggtaaagt tatagtaacc 2760

cagaatgaaa atattgtata taatgctatg tatgaaagtt ttagtattag tttttggatt 2820

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aactcaggtt ggagtatagg tattattagt aatttttag tgtttacttt aaaacaaaat 2940

gaaaatagtg aacaagatat aaactttagt tatgatatat caaagaatgc tgcgggatat 3000

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gatttaagat atgataaaga atattacatg attaacgtaa attatatgaa tagatatatg 3360

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Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile Thr Thr
            20                  25                  30

Pro Val Lys Ala Phe Met Ile Thr Gln Asn Ile Trp Val Ile Pro Glu
        35                  40                  45

Arg Phe Ser Ser Asp Thr Asn Pro Ser Leu Ser Lys Pro Pro Arg Pro
    50                  55                  60

Thr Ser Lys Tyr Gln Ser Tyr Tyr Asp Pro Ser Tyr Leu Ser Thr Asp
65                  70                  75                  80

Glu Gln Lys Asp Thr Phe Leu Lys Gly Ile Ile Lys Leu Phe Lys Arg
                85                  90                  95

Ile Asn Glu Arg Asp Ile Gly Lys Lys Leu Ile Asn Tyr Leu Val Val
            100                 105                 110

Gly Ser Pro Phe Met Gly Asp Ser Ser Thr Pro Glu Asp Thr Phe Asp
        115                 120                 125

Phe Thr Arg His Thr Thr Asn Ile Ala Val Glu Lys Phe Glu Asn Gly
    130                 135                 140

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

Pro Leu Pro Asn Ile Leu Asp Tyr Thr Ala Ser Leu Thr Leu Gln Gly
                165                 170                 175

Gln Gln Ser Asn Pro Ser Phe Glu Gly Phe Gly Thr Leu Ser Ile Leu
            180                 185                 190

Lys Val Ala Pro Glu Phe Leu Leu Thr Phe Ser Asp Val Thr Ser Asn
        195                 200                 205

Gln Ser Ser Ala Val Leu Gly Lys Ser Ile Phe Cys Met Asp Pro Val
    210                 215                 220

Ile Ala Leu Met His Glu Leu Thr His Ser Leu His Gln Leu Tyr Gly
225                 230                 235                 240

Ile Asn Ile Pro Ser Asp Lys Arg Ile Arg Pro Gln Val Ser Glu Gly
                245                 250                 255
```

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Phe Phe Ser Gln Asp Gly Pro Asn Val Gln Phe Glu Glu Leu Tyr Thr
            260                 265                 270

Phe Gly Gly Ser Asp Val Glu Ile Ile Pro Gln Ile Glu Arg Leu Gln
        275                 280                 285

Leu Arg Glu Lys Ala Leu Gly His Tyr Lys Asp Ile Ala Lys Arg Leu
    290                 295                 300

Asn Asn Ile Asn Lys Thr Ile Pro Ser Ser Trp Ser Ser Asn Ile Asp
305                 310                 315                 320

Lys Tyr Lys Lys Ile Phe Ser Glu Lys Tyr Asn Phe Asp Lys Asp Asn
                325                 330                 335

Thr Gly Asn Phe Val Val Asn Ile Asp Lys Phe Asn Ser Leu Tyr Ser
            340                 345                 350

Asp Leu Thr Asn Val Met Ser Glu Val Val Tyr Ser Ser Gln Tyr Asn
        355                 360                 365

Val Lys Asn Arg Thr His Tyr Phe Ser Lys His Tyr Leu Pro Val Phe
    370                 375                 380

Ala Asn Ile Leu Asp Asp Asn Ile Tyr Thr Ile Ile Asn Gly Phe Asn
385                 390                 395                 400

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

Arg Asn Pro Ala Leu Gln Lys Leu Ser Ser Glu Ser Val Val Asp Leu
            420                 425                 430

Phe Thr Lys Val Cys Leu Arg Leu Thr Arg Asn Ser Arg Asp Asp Ser
        435                 440                 445

Thr Cys Ile Gln Val Lys Asn Asn Thr Leu Pro Tyr Val Ala Asp Lys
    450                 455                 460

Asp Ser Ile Ser Gln Glu Ile Phe Glu Ser Gln Ile Ile Thr Asp Glu
465                 470                 475                 480

Thr Asn Val Glu Asn Tyr Ser Asp Asn Phe Ser Leu Asp Glu Ser Ile
                485                 490                 495

Leu Asp Ala Lys Val Pro Thr Asn Pro Glu Ala Val Asp Pro Leu Leu
            500                 505                 510
```

```
Pro Asn Val Asn Met Glu Pro Leu Asn Val Pro Gly Glu Glu Glu Val
        515                 520                 525

Phe Tyr Asp Asp Ile Thr Lys Asp Val Asp Tyr Leu Asn Ser Tyr Tyr
    530                 535                 540

Tyr Leu Glu Ala Gln Lys Leu Ser Asn Asn Val Glu Asn Ile Thr Leu
545                 550                 555                 560

Thr Thr Ser Val Glu Glu Ala Leu Gly Tyr Ser Asn Lys Ile Tyr Thr
                565                 570                 575

Phe Leu Pro Ser Leu Ala Glu Lys Val Asn Lys Gly Val Gln Ala Gly
            580                 585                 590

Leu Phe Leu Asn Trp Ala Asn Glu Val Val Glu Asp Phe Thr Thr Asn
        595                 600                 605

Ile Met Lys Lys Asp Thr Leu Asp Lys Ile Ser Asp Val Ser Ala Ile
    610                 615                 620

Ile Pro Tyr Ile Gly Pro Ala Leu Asn Ile Gly Asn Ser Ala Leu Arg
625                 630                 635                 640

Gly Asn Phe Lys Gln Ala Phe Ala Thr Ala Gly Val Ala Phe Leu Leu
                645                 650                 655

Glu Gly Phe Pro Glu Phe Thr Ile Pro Ala Leu Gly Val Phe Thr Phe
            660                 665                 670

Tyr Ser Ser Ile Gln Glu Arg Glu Lys Ile Ile Lys Thr Ile Glu Asn
        675                 680                 685

Cys Leu Glu Gln Arg Val Lys Arg Trp Lys Asp Ser Tyr Gln Trp Met
    690                 695                 700

Val Ser Asn Trp Leu Ser Arg Ile Thr Thr Arg Phe Asn His Ile Ser
705                 710                 715                 720

Tyr Gln Met Tyr Asp Ser Leu Ser Tyr Gln Ala Asp Ala Ile Lys Ala
                725                 730                 735

Lys Ile Asp Leu Glu Tyr Lys Lys Tyr Ser Gly Ser Asp Lys Glu Asn
            740                 745                 750

Ile Lys Ser Gln Val Glu Asn Leu Lys Asn Ser Leu Asp Val Lys Ile
```

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        755                 760                 765

Ser Glu Ala Met Asn Asn Ile Asn Lys Phe Ile Arg Glu Cys Ser Val
    770                 775                 780

Thr Tyr Leu Phe Lys Asn Met Leu Pro Lys Val Ile Asp Glu Leu Asn
785                 790                 795                 800

Lys Phe Asp Leu Lys Thr Lys Thr Glu Leu Ile Asn Leu Ile Asp Ser
                805                 810                 815

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

Asn Glu Ser Phe Glu Asn Thr Ile Pro Phe Asn Ile Phe Ser Tyr Thr
        835                 840                 845

Asn Asn Ser Leu Leu Lys Asp Met Ile Asn Glu Tyr Phe Asn Ser Ile
    850                 855                 860

Asn Asp Ser Lys Ile Leu Ser Leu Gln Asn Lys Lys Asn Thr Leu Met
865                 870                 875                 880

Asp Thr Ser Gly Tyr Asn Ala Glu Val Arg Val Glu Gly Asn Val Gln
                885                 890                 895

Leu Asn Pro Ile Phe Pro Phe Asp Phe Lys Leu Gly Ser Ser Gly Asp
            900                 905                 910

Asp Arg Gly Lys Val Ile Val Thr Gln Asn Glu Asn Ile Val Tyr Asn
        915                 920                 925

Ala Met Tyr Glu Ser Phe Ser Ile Ser Phe Trp Ile Arg Ile Asn Lys
    930                 935                 940

Trp Val Ser Asn Leu Pro Gly Tyr Thr Ile Ile Asp Ser Val Lys Asn
945                 950                 955                 960

Asn Ser Gly Trp Ser Ile Gly Ile Ile Ser Asn Phe Leu Val Phe Thr
                965                 970                 975

Leu Lys Gln Asn Glu Asn Ser Glu Gln Asp Ile Asn Phe Ser Tyr Asp
            980                 985                 990

Ile Ser Lys Asn Ala Ala Gly Tyr  Asn Lys Trp Phe Phe  Val Thr Ile
        995                 1000                1005
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Thr Thr  Asn Met Met Gly Asn  Met Met Ile Tyr Ile  Asn Gly Lys
    1010                1015                1020

Leu Ile  Asp Thr Ile Lys Val  Lys Glu Leu Thr Gly  Ile Asn Phe
    1025                1030                1035

Ser Lys  Thr Ile Thr Phe Gln  Met Asn Lys Ile Pro  Asn Thr Gly
    1040                1045                1050

Leu Ile  Thr Ser Asp Ser Asp  Asn Ile Asn Met Trp  Ile Arg Asp
    1055                1060                1065

Phe Tyr  Ile Phe Ala Lys Glu  Leu Asp Asp Lys Asp  Ile Asn Ile
    1070                1075                1080

Leu Phe  Asn Ser Leu Gln Tyr  Thr Asn Val Val Lys  Asp Tyr Trp
    1085                1090                1095

Gly Asn  Asp Leu Arg Tyr Asp  Lys Glu Tyr Tyr Met  Ile Asn Val
    1100                1105                1110

Asn Tyr  Met Asn Arg Tyr Met  Ser Lys Lys Gly Asn  Gly Ile Val
    1115                1120                1125

Phe Asn  Thr Arg Lys Asn Asn  Asn Asp Phe Asn Glu  Gly Tyr Lys
    1130                1135                1140

Ile Ile  Ile Lys Arg Ile Arg  Gly Asn Thr Asn Asp  Thr Arg Val
    1145                1150                1155

Arg Gly  Glu Asn Val Leu Tyr  Phe Asn Thr Thr Ile  Asp Asn Lys
    1160                1165                1170

Gln Tyr  Ser Leu Gly Met Tyr  Lys Pro Ser Arg Asn  Leu Gly Thr
    1175                1180                1185

Asp Leu  Val Pro Leu Gly Ala  Leu Asp Gln Pro Met  Asp Glu Ile
    1190                1195                1200

Arg Lys  Tyr Gly Ser Phe Ile  Ile Gln Pro Cys Asn  Thr Phe Asp
    1205                1210                1215

Tyr Tyr  Ala Ser Gln Leu Phe  Leu Ser Ser Asn Ala  Thr Thr Asn
    1220                1225                1230

Arg Leu  Gly Ile Leu Ser Ile  Gly Ser Tyr Ser Phe  Lys Leu Gly
    1235                1240                1245
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Asp Asp Tyr Trp Phe Asn His Glu Tyr Leu Ile Pro Val Ile Lys
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Ile Glu His Tyr Ala Ser Leu Leu Glu Ser Thr Ser Thr His Trp
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Val Phe Val Pro Ala Ser Glu
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ttaaaaaatg gagatagtag ttattatgac cctaattatt tacaaagtga tgaagaaaag 240

gatagatttt taaaaatagt cacaaaaata tttaatagaa taaataataa tctttcagga 300

gggattttat tagaagaact gtcaaaagct aatccatatt tagggaatga taatactcca 360

gataatcaat tccatattgg tgatgcatca gcagttgaga ttaaattctc aaatggtagc 420

caagacatac tattacctaa tgttattata atgggagcag agcctgattt atttgaaact 480

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Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130 135 140

```
Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
145                 150                 155                 160

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Arg Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Cys Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Arg Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400
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Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Lys Asn Ile Val
                405                 410                 415

Ser Val Lys Gly Ile Arg Lys Ser Ile Cys Ile Glu Ile Asn Asn Gly
            420                 425                 430

Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn Asp Asp Asn Ile
        435                 440                 445

Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser Asn Asn Asn Tyr
    450                 455                 460

Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn Ser Glu Ser Ala
465                 470                 475                 480

Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile Gln Asn Asp Ala
                485                 490                 495

Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp Ile Glu Gln His
            500                 505                 510

Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp Ala Gln Lys Val
        515                 520                 525

Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser Ile Asp Thr Ala
    530                 535                 540

Leu Leu Glu Gln Pro Lys Ile Tyr Thr Phe Phe Ser Ser Glu Phe Ile
545                 550                 555                 560

Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe Val Ser Trp Ile
                565                 570                 575

Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn Gln Lys Ser Thr
            580                 585                 590

Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro Tyr Ile Gly Leu
        595                 600                 605

Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn Phe Lys Asp Ala
    610                 615                 620

Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe Glu Pro Glu Leu
625                 630                 635                 640

Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser Phe Leu Gly Ser
                645                 650                 655
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Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn Asn Ala Leu Lys
            660                 665                 670

Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe Ile Val Ser Asn
        675                 680                 685

Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg Lys Glu Gln Met
    690                 695                 700

Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys Thr Ile Ile Glu
705                 710                 715                 720

Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn Glu Leu Thr Asn
                725                 730                 735

Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn Gln Lys Val Ser
            740                 745                 750

Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu Ser Ser Ile Ser
        755                 760                 765

Tyr Leu Met Lys Ile Ile Asn Glu Val Lys Ile Asn Lys Leu Arg Glu
    770                 775                 780

Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr Ile Ile Gln His
785                 790                 795                 800

Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn Ser Met Val Thr
                805                 810                 815

Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser Ser Tyr Thr Asp
            820                 825                 830

Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe Lys Arg Ile Lys
        835                 840                 845

Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp Lys Tyr Val Asp
    850                 855                 860

Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly Asp Val Tyr Lys
865                 870                 875                 880

Tyr Pro Thr Asn Lys Asn Gln Phe Gly Ile Tyr Asn Asp Lys Leu Ser
                885                 890                 895

Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr Asp Asn Lys Tyr
```

eolf-seql

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Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro Asn Tyr Asp Asn
        915                 920                 925

Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile Asn Cys Met Arg
    930                 935                 940

Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His Asn Glu Ile Ile
945                 950                 955                 960

Trp Thr Phe Glu Asp Asn Arg Gly Ile Asn Gln Lys Leu Ala Phe Asn
                965                 970                 975

Tyr Gly Asn Ala Asn Gly Ile Ser Asp Tyr Ile Asn Lys Trp Ile Phe
            980                 985                 990

Val Thr Ile Thr Asn Asp Arg Leu  Gly Asp Ser Lys Leu  Tyr Ile Asn
        995                 1000                1005

Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu Asn Leu  Gly Asn Ile
    1010                1015                1020

His Val  Ser Asp Asn Ile Leu  Phe Lys Ile Val Asn  Cys Ser Tyr
    1025                1030                1035

Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn Ile Phe  Asp Lys Glu
    1040                1045                1050

Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr Ser Asn  Glu Pro Asn
    1055                1060                1065

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

Arg Asp Thr Ile Gly Thr Lys Pro Asp Glu Phe Gln Val Pro Asp Ser

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Leu Lys Asn Gly Ser Ser Ala Tyr Tyr Asp Pro Asn Tyr Leu Thr Thr
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Asp Ala Glu Lys Asp Arg Tyr Leu Lys Thr Met Ile Lys Leu Phe Asn
                85                  90                  95

Arg Ile Asn Ser Asn Pro Thr Gly Lys Val Leu Leu Glu Glu Val Ser
            100                 105                 110

Asn Ala Arg Pro Tyr Leu Gly Asp Asp Asp Thr Leu Ile Asn Glu Phe
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Leu Pro Val Asn Val Thr Thr Ser Val Asn Ile Lys Phe Ser Thr Asp
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Val Glu Ser Ser Ile Ile Ser Asn Leu Leu Val Leu Gly Ala Gly Pro
145                 150                 155                 160

Asp Ile Phe Lys Ala Tyr Cys Thr Pro Leu Val Arg Phe Asn Lys Ser
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Asp Lys Leu Ile Glu Pro Ser Asn His Gly Phe Gly Ser Ile Asn Ile
            180                 185                 190

Leu Thr Phe Ser Pro Glu Tyr Glu His Ile Phe Asn Asp Ile Ser Gly
        195                 200                 205

Gly Asn His Asn Ser Thr Glu Ser Phe Ile Ala Asp Pro Ala Ile Ser
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Leu Ala His Glu Leu Ile His Ala Leu His Gly Leu Tyr Gly Ala Lys
225                 230                 235                 240

Ala Val Thr His Lys Glu Ser Leu Val Ala Glu Arg Gly Pro Leu Met
                245                 250                 255

Ile Ala Glu Lys Pro Ile Arg Leu Glu Glu Phe Leu Thr Phe Gly Gly
            260                 265                 270

Glu Asp Leu Asn Ile Ile Pro Ser Ala Met Lys Glu Lys Ile Tyr Asn
        275                 280                 285

Asp Leu Leu Ala Asn Tyr Glu Lys Ile Ala Thr Arg Leu Arg Glu Val
    290                 295                 300
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Asn Thr Ala Pro Pro Gly Tyr Asp Ile Asn Glu Tyr Lys Asp Tyr Phe
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Gln Trp Lys Tyr Gly Leu Asp Arg Asn Ala Asp Gly Ser Tyr Thr Val
                325                 330                 335

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

Glu Ile Asp Leu Ala Asn Lys Phe Lys Val Lys Cys Arg Asn Thr Tyr
        355                 360                 365

Phe Ile Lys Tyr Gly Phe Val Lys Val Pro Asn Leu Leu Asp Asp Asp
    370                 375                 380

Ile Tyr Thr Val Ser Glu Gly Phe Asn Ile Gly Asn Leu Ala Val Asn
385                 390                 395                 400

Asn Arg Gly Gln Asn Ile Asn Leu Asn Pro Lys Ile Ile Asp Ser Ile
                405                 410                 415

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

Ile Pro Arg Lys Gly Thr Lys Gln Ser Pro Ser Leu Cys Ile Arg Val
        435                 440                 445

Asn Asn Arg Glu Leu Phe Phe Val Ala Ser Glu Ser Ser Tyr Asn Glu
    450                 455                 460

Ser Asp Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Thr Asn Leu Asn
465                 470                 475                 480

Asn Asn Tyr Arg Asn Asn Leu Asp Glu Val Ile Leu Asp Tyr Asn Ser
                485                 490                 495

Glu Thr Ile Pro Gln Ile Ser Asn Arg Thr Leu Asn Thr Leu Val Gln
            500                 505                 510

Asp Asn Ser Tyr Val Pro Arg Tyr Asp Ser Asn Gly Thr Ser Glu Ile
        515                 520                 525

Glu Glu Tyr Asp Val Val Asp Phe Asn Val Phe Phe Tyr Leu His Ala
    530                 535                 540

Gln Lys Val Pro Glu Gly Glu Thr Asn Ile Ser Leu Thr Ser Ser Ile
545                 550                 555                 560
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Asp Thr Ala Leu Leu Glu Glu Ser Lys Val Tyr Thr Phe Phe Ser Ser
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Glu Phe Ile Asp Thr Ile Asn Lys Pro Val Asn Ala Ala Leu Phe Ile
            580                 585                 590

Asp Trp Ile Ser Lys Val Ile Arg Asp Phe Thr Thr Glu Ala Thr Gln
        595                 600                 605

Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Leu Ile Val Pro Tyr
    610                 615                 620

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

Ile Asp Ser Tyr Glu Asn Lys Asn Lys Ala Ile Lys Ala Ile Asn Asn
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Ser Leu Ile Glu Arg Glu Ala Lys Trp Lys Glu Ile Tyr Ser Trp Ile
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Val Ser Asn Trp Leu Thr Arg Ile Asn Thr Gln Phe Asn Lys Arg Lys
705                 710                 715                 720

Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asp Ala Ile Lys Thr
                725                 730                 735

Ala Ile Glu Tyr Lys Tyr Asn Asn Tyr Thr Ser Asp Glu Lys Asn Arg
            740                 745                 750

Leu Glu Ser Lys Tyr Asn Ile Asn Asn Ile Glu Glu Glu Leu Asn Lys
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Lys Val Ser Leu Ala Met Lys Asn Ile Glu Arg Phe Met Thr Glu Ser
    770                 775                 780

Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Ala Glu Val Gly Lys
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Leu Lys Glu Tyr Asp Lys His Val Lys Ser Asp Leu Leu Asp Tyr Ile
                805                 810                 815
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Leu Val Thr Ser Thr Leu Asn Ser Ser Ile Pro Phe Glu Leu Ser Ser
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Tyr Thr Asn Asp Lys Ile Leu Ile Ile Tyr Phe Asn Arg Leu Tyr Lys
    850                 855                 860

Lys Ile Lys Asp Ser Ser Ile Leu Asp Met Arg Tyr Glu Asn Asn Lys
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Phe Ile Asp Ile Ser Gly Tyr Gly Ser Asn Ile Ser Ile Asn Gly Asn
                885                 890                 895

Val Tyr Ile Tyr Ser Thr Asn Arg Asn Gln Phe Gly Ile Tyr Ser Gly
            900                 905                 910

Arg Leu Ser Glu Val Asn Ile Ala Gln Asn Asn Asp Ile Ile Tyr Asn
        915                 920                 925

Ser Arg Tyr Gln Asn Phe Ser Ile Ser Phe Trp Val Thr Ile Pro Lys
    930                 935                 940

His Tyr Arg Pro Met Asn Arg Asn Arg Glu Tyr Thr Ile Ile Asn Cys
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Met Gly Asn Asn Asn Ser Gly Trp Lys Ile Ser Leu Arg Thr Ile Arg
                965                 970                 975

Asp Cys Glu Ile Ile Trp Thr Leu Gln Asp Thr Ser Gly Asn Lys Glu
            980                 985                 990

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

Arg Phe Thr Tyr Gly Phe Gln Pro Asp Gln Phe Asn Ala Ser Thr Gly
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Val Phe Ser Lys Asp Val Tyr Glu Tyr Tyr Asp Pro Thr Tyr Leu Lys
65 70 75 80

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

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Pro Gly Ala Glu Asp Gln Ile Lys Gly Leu Met Thr Asn Leu Ile Ile
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Met Asn Gly His Ser Pro Ile Ser Glu Gly Phe Gly Ala Arg Met Met
            180                 185                 190

Ile Arg Phe Cys Pro Ser Cys Leu Asn Val Phe Asn Asn Val Gln Glu
        195                 200                 205

Asn Lys Asp Thr Ser Ile Phe Ser Arg Arg Ala Tyr Phe Ala Asp Pro
    210                 215                 220

Ala Leu Thr Leu Met His Glu Leu Ile His Val Leu His Gly Leu Tyr
225                 230                 235                 240

Gly Ile Lys Ile Ser Asn Leu Pro Ile Thr Pro Asn Thr Lys Glu Phe
                245                 250                 255

Phe Met Gln His Ser Asp Pro Val Gln Ala Glu Glu Leu Tyr Thr Phe
            260                 265                 270

Gly Gly His Asp Pro Ser Val Ile Ser Pro Ser Thr Asp Met Asn Ile
        275                 280                 285

Tyr Asn Lys Ala Leu Gln Asn Phe Gln Asp Ile Ala Asn Arg Leu Asn
    290                 295                 300

Ile Val Ser Ser Ala Gln Gly Ser Gly Ile Asp Ile Ser Leu Tyr Lys
305                 310                 315                 320

Gln Ile Tyr Lys Asn Lys Tyr Asp Phe Val Glu Asp Pro Asn Gly Lys
                325                 330                 335

Tyr Ser Val Asp Lys Asp Lys Phe Asp Lys Leu Tyr Lys Ala Leu Met
            340                 345                 350

Phe Gly Phe Thr Glu Thr Asn Leu Ala Gly Glu Tyr Gly Ile Lys Thr
        355                 360                 365

Arg Tyr Ser Tyr Phe Ser Glu Tyr Leu Pro Pro Ile Lys Thr Glu Lys
    370                 375                 380
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Leu Leu Asp Asn Thr Ile Tyr Thr Gln Asn Glu Gly Phe Asn Ile Ala
385                 390                 395                 400

Ser Lys Asn Leu Lys Thr Glu Phe Asn Gly Gln Asn Lys Ala Val Asn
                405                 410                 415

Lys Glu Ala Tyr Glu Glu Ile Ser Leu Glu His Leu Val Ile Tyr Arg
            420                 425                 430

Ile Ala Met Cys Lys Pro Val Met Tyr Lys Asn Thr Gly Lys Ser Glu
        435                 440                 445

Gln Cys Ile Ile Val Asn Asn Glu Asp Leu Phe Phe Ile Ala Asn Lys
    450                 455                 460

Asp Ser Phe Ser Lys Asp Leu Ala Lys Ala Glu Thr Ile Ala Tyr Asn
465                 470                 475                 480

Thr Gln Asn Asn Thr Ile Glu Asn Asn Phe Ser Ile Asp Gln Leu Ile
                485                 490                 495

Leu Asp Asn Asp Leu Ser Ser Gly Ile Asp Leu Pro Asn Glu Asn Thr
            500                 505                 510

Glu Pro Phe Thr Asn Phe Asp Asp Ile Asp Ile Pro Val Tyr Ile Lys
        515                 520                 525

Gln Ser Ala Leu Lys Lys Ile Phe Val Asp Gly Asp Ser Leu Phe Glu
    530                 535                 540

Tyr Leu His Ala Gln Thr Phe Pro Ser Asn Ile Glu Asn Leu Gln Leu
545                 550                 555                 560

Thr Asn Ser Leu Asn Asp Ala Leu Arg Asn Asn Asn Lys Val Tyr Thr
                565                 570                 575

Phe Phe Ser Thr Asn Leu Val Glu Lys Ala Asn Thr Val Val Gly Ala
            580                 585                 590

Ser Leu Phe Val Asn Trp Val Lys Gly Val Ile Asp Asp Phe Thr Ser
        595                 600                 605

Glu Ser Thr Gln Lys Ser Thr Ile Asp Lys Val Ser Asp Val Ser Ile
    610                 615                 620

Ile Ile Pro Tyr Ile Gly Pro Ala Leu Asn Val Gly Asn Glu Thr Ala
625                 630                 635                 640
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Lys Glu Asn Phe Lys Asn Ala Phe Glu Ile Gly Gly Ala Ala Ile Leu
                645                 650                 655

Met Glu Phe Ile Pro Glu Leu Ile Val Pro Ile Val Gly Phe Phe Thr
            660                 665                 670

Leu Glu Ser Tyr Val Gly Asn Lys Gly His Ile Ile Met Thr Ile Ser
        675                 680                 685

Asn Ala Leu Lys Lys Arg Asp Gln Lys Trp Thr Asp Met Tyr Gly Leu
    690                 695                 700

Ile Val Ser Gln Trp Leu Ser Thr Val Asn Thr Gln Phe Tyr Thr Ile
705                 710                 715                 720

Lys Glu Arg Met Tyr Asn Ala Leu Asn Asn Gln Ser Gln Ala Ile Glu
                725                 730                 735

Lys Ile Ile Glu Asp Gln Tyr Asn Arg Tyr Ser Glu Glu Asp Lys Met
            740                 745                 750

Asn Ile Asn Ile Asp Phe Asn Asp Ile Asp Phe Lys Leu Asn Gln Ser
        755                 760                 765

Ile Asn Leu Ala Ile Asn Asn Ile Asp Asp Phe Ile Asn Gln Cys Ser
    770                 775                 780

Ile Ser Tyr Leu Met Asn Arg Met Ile Pro Leu Ala Val Lys Lys Leu
785                 790                 795                 800

Lys Asp Phe Asp Asp Asn Leu Lys Arg Asp Leu Leu Glu Tyr Ile Asp
                805                 810                 815

Thr Asn Glu Leu Tyr Leu Leu Asp Glu Val Asn Ile Leu Lys Ser Lys
            820                 825                 830

Val Asn Arg His Leu Lys Asp Ser Ile Pro Phe Asp Leu Ser Leu Tyr
        835                 840                 845

Thr Lys Asp Thr Ile Leu Ile Gln Val Phe Asn Asn Tyr Ile Ser Asn
    850                 855                 860

Ile Ser Ser Asn Ala Ile Leu Ser Leu Ser Tyr Arg Gly Gly Arg Leu
865                 870                 875                 880

Ile Asp Ser Ser Gly Tyr Gly Ala Thr Met Asn Val Gly Ser Asp Val
                885                 890                 895
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Ile Phe Asn Asp Ile Gly Asn Gly Gln Phe Lys Leu Asn Asn Ser Glu
            900                 905                 910

Asn Ser Asn Ile Thr Ala His Gln Ser Lys Phe Val Val Tyr Asp Ser
        915                 920                 925

Met Phe Asp Asn Phe Ser Ile Asn Phe Trp Val Arg Thr Pro Lys Tyr
    930                 935                 940

Asn Asn Asn Asp Ile Gln Thr Tyr Leu Gln Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Ser Cys Ile Lys Asn Asp Ser Gly Trp Lys Val Ser Ile Lys Gly Asn
                965                 970                 975

Arg Ile Ile Trp Thr Leu Ile Asp Val Asn Ala Lys Ser Lys Ser Ile
            980                 985                 990

Phe Phe Glu Tyr Ser Ile Lys Asp  Asn Ile Ser Asp Tyr  Ile Asn Lys
        995                 1000                1005

Trp Phe  Ser Ile Thr Ile Thr  Asn Asp Arg Leu Gly  Asn Ala Asn
    1010                1015                1020

Ile Tyr  Ile Asn Gly Ser Leu  Lys Lys Ser Glu Lys  Ile Leu Asn
    1025                1030                1035

Leu Asp  Arg Ile Asn Ser Ser  Asn Asp Ile Asp Phe  Lys Leu Ile
    1040                1045                1050

Asn Cys  Thr Asp Thr Thr Lys  Phe Val Trp Ile Lys  Asp Phe Asn
    1055                1060                1065

Ile Phe  Gly Arg Glu Leu Asn  Ala Thr Glu Val Ser  Ser Leu Tyr
    1070                1075                1080

Trp Ile  Gln Ser Ser Thr Asn  Thr Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Pro Leu  Arg Tyr Asp Thr Gln  Tyr Tyr Leu Phe Asn  Gln Gly Met
    1100                1105                1110

Gln Asn  Ile Tyr Ile Lys Tyr  Phe Ser Lys Ala Ser  Met Gly Glu
    1115                1120                1125

Thr Ala  Pro Arg Thr Asn Phe  Asn Asn Ala Ala Ile  Asn Tyr Gln
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1130 1135 1140

Asn Leu Tyr Leu Gly Leu Arg Phe Ile Ile Lys Lys Ala Ser Asn
1145 1150 1155

Ser Arg Asn Ile Asn Asn Asp Asn Ile Val Arg Glu Gly Asp Tyr
1160 1165 1170

Ile Tyr Leu Asn Ile Asp Asn Ile Ser Asp Glu Ser Tyr Arg Val
1175 1180 1185

Tyr Val Leu Val Asn Ser Lys Glu Ile Gln Thr Gln Leu Phe Leu
1190 1195 1200

Ala Pro Ile Asn Asp Asp Pro Thr Phe Tyr Asp Val Leu Gln Ile
1205 1210 1215

Lys Lys Tyr Tyr Glu Lys Thr Thr Tyr Asn Cys Gln Ile Leu Cys
1220 1225 1230

Glu Lys Asp Thr Lys Thr Phe Gly Leu Phe Gly Ile Gly Lys Phe
1235 1240 1245

Val Lys Asp Tyr Gly Tyr Val Trp Asp Thr Tyr Asp Asn Tyr Phe
1250 1255 1260

Cys Ile Ser Gln Trp Tyr Leu Arg Arg Ile Ser Glu Asn Ile Asn
1265 1270 1275

Lys Leu Arg Leu Gly Cys Asn Trp Gln Phe Ile Pro Val Asp Glu
1280 1285 1290

Gly Trp Thr Glu
1295

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<212> DNA
<213> Clostridium tetani

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ttaattatga ataatattct taagataaaa agtaaatttt taaaaattta aattttcagt 120

ttacaaaaaa taacctgatt atgttatatg taattgtaaa aaacatataa aaaatcagaa 180

aaatttagga ggtatattat taatggatta aataataatt ttttaattta cttttgatta 240

ataaatatta aatgtttatt ttaattagga gatgatacgt atgccaataa ccataaataa 300

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taagggtcta gatatctatt ataaggcttt caaaataaca gatcgtattt ggatagtgcc      420
ggaaaggtat gaatttggga caaaacctga agattttaac ccaccatctt cattaataga      480
aggtgcatct gagtattacg atccaaatta tttaaggact gattctgata aagatagatt      540
tttacaaacc atggtaaaac tgtttaacag aattaaaaac aatgtagcag gtgaagcctt      600
attagataag ataataaatg ccatacctta ccttggaaat tcatattcct tactagacaa      660
gtttgataca aactctaatt cagtatcttt taatttatta gaacaagacc ccagtggagc      720
aactacaaaa tcagcaatgc tgacaaattt aataatattt ggacctgggc ctgttttaaa      780
taaaaatgag gttagaggta ttgtattgag ggtagataat aaaaattact tcccatgtag      840
agatggtttt ggctcaataa tgcaaatggc attttgccca gaatatgtac ctacctttga      900
taatgtaata gaaaatatta cgtcactcac tattggcaaa agcaaatatt ttcaagatcc      960
agcattacta ttaatgcacg aacttataca tgtactacat ggtttatacg gaatgcaggt     1020
atcaagccat gaaattattc catccaaaca agaaatttat atgcagcata catatccaat     1080
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aaaatctcct acaactctac aaagaataac tatgactaat tctgttgatg acgcattaat     2040
aaattccacc aaaatatatt catattttcc atctgtaatc agtaaagtta accaaggtgc     2100
acaaggaatt ttattcttac agtgggtgag agatataatt gatgatttta ccaatgaatc     2160
ttcacaaaaa actactattg ataaaatttc agatgtatcc actattgttc cttatatagg     2220
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aaaaattaaa taatataaca atctagctat attatttttg attattttct taatatatac 4320

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<211> 1315
<212> PRT
<213> Clostridium tetani

<400> 16

Met Pro Ile Thr Ile Asn Asn Phe Arg Tyr Ser Asp Pro Val Asn Asn
1 5 10 15

Asp Thr Ile Ile Met Met Glu Pro Pro Tyr Cys Lys Gly Leu Asp Ile
20 25 30

Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp Ile Val Pro Glu
35 40 45

Arg Tyr Glu Phe Gly Thr Lys Pro Glu Asp Phe Asn Pro Pro Ser Ser
50 55 60

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

Asp Ser Asp Lys Asp Arg Phe Leu Gln Thr Met Val Lys Leu Phe Asn
85 90 95

Arg Ile Lys Asn Asn Val Ala Gly Glu Ala Leu Leu Asp Lys Ile Ile
100 105 110

Asn Ala Ile Pro Tyr Leu Gly Asn Ser Tyr Ser Leu Leu Asp Lys Phe
115 120 125

Asp Thr Asn Ser Asn Ser Val Ser Phe Asn Leu Leu Glu Gln Asp Pro
130 135 140

Ser Gly Ala Thr Thr Lys Ser Ala Met Leu Thr Asn Leu Ile Ile Phe
145 150 155 160

Gly Pro Gly Pro Val Leu Asn Lys Asn Glu Val Arg Gly Ile Val Leu
165 170 175

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Arg Val Asp Asn Lys Asn Tyr Phe Pro Cys Arg Asp Gly Phe Gly Ser
            180                 185                 190

Ile Met Gln Met Ala Phe Cys Pro Glu Tyr Val Pro Thr Phe Asp Asn
        195                 200                 205

Val Ile Glu Asn Ile Thr Ser Leu Thr Ile Gly Lys Ser Lys Tyr Phe
    210                 215                 220

Gln Asp Pro Ala Leu Leu Leu Met His Glu Leu Ile His Val Leu His
225                 230                 235                 240

Gly Leu Tyr Gly Met Gln Val Ser Ser His Glu Ile Ile Pro Ser Lys
                245                 250                 255

Gln Glu Ile Tyr Met Gln His Thr Tyr Pro Ile Ser Ala Glu Glu Leu
            260                 265                 270

Phe Thr Phe Gly Gly Gln Asp Ala Asn Leu Ile Ser Ile Asp Ile Lys
        275                 280                 285

Asn Asp Leu Tyr Glu Lys Thr Leu Asn Asp Tyr Lys Ala Ile Ala Asn
    290                 295                 300

Lys Leu Ser Gln Val Thr Ser Cys Asn Asp Pro Asn Ile Asp Ile Asp
305                 310                 315                 320

Ser Tyr Lys Gln Ile Tyr Gln Gln Lys Tyr Gln Phe Asp Lys Asp Ser
                325                 330                 335

Asn Gly Gln Tyr Ile Val Asn Glu Asp Lys Phe Gln Ile Leu Tyr Asn
            340                 345                 350

Ser Ile Met Tyr Gly Phe Thr Glu Ile Glu Leu Gly Lys Lys Phe Asn
        355                 360                 365

Ile Lys Thr Arg Leu Ser Tyr Phe Ser Met Asn His Asp Pro Val Lys
    370                 375                 380

Ile Pro Asn Leu Leu Asp Asp Thr Ile Tyr Asn Asp Thr Glu Gly Phe
385                 390                 395                 400

Asn Ile Glu Ser Lys Asp Leu Lys Ser Glu Tyr Lys Gly Gln Asn Met
                405                 410                 415

Arg Val Asn Thr Asn Ala Phe Arg Asn Val Asp Gly Ser Gly Leu Val
            420                 425                 430
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Ser Lys Leu Ile Gly Leu Cys Lys Lys Ile Ile Pro Pro Thr Asn Ile
        435                 440                 445

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

Glu Leu Cys Ile Lys Ile Lys Asn Glu Asp Leu Thr Phe Ile Ala Glu
465                 470                 475                 480

Lys Asn Ser Phe Ser Glu Glu Pro Phe Gln Asp Glu Ile Val Ser Tyr
                485                 490                 495

Asn Thr Lys Asn Lys Pro Leu Asn Phe Asn Tyr Ser Leu Asp Lys Ile
            500                 505                 510

Ile Val Asp Tyr Asn Leu Gln Ser Lys Ile Thr Leu Pro Asn Asp Arg
        515                 520                 525

Thr Thr Pro Val Thr Lys Gly Ile Pro Tyr Ala Pro Glu Tyr Lys Ser
    530                 535                 540

Asn Ala Ala Ser Thr Ile Glu Ile His Asn Ile Asp Asp Asn Thr Ile
545                 550                 555                 560

Tyr Gln Tyr Leu Tyr Ala Gln Lys Ser Pro Thr Thr Leu Gln Arg Ile
                565                 570                 575

Thr Met Thr Asn Ser Val Asp Asp Ala Leu Ile Asn Ser Thr Lys Ile
            580                 585                 590

Tyr Ser Tyr Phe Pro Ser Val Ile Ser Lys Val Asn Gln Gly Ala Gln
        595                 600                 605

Gly Ile Leu Phe Leu Gln Trp Val Arg Asp Ile Ile Asp Asp Phe Thr
    610                 615                 620

Asn Glu Ser Ser Gln Lys Thr Thr Ile Asp Lys Ile Ser Asp Val Ser
625                 630                 635                 640

Thr Ile Val Pro Tyr Ile Gly Pro Ala Leu Asn Ile Val Lys Gln Gly
                645                 650                 655

Tyr Glu Gly Asn Phe Ile Gly Ala Leu Glu Thr Thr Gly Val Val Leu
            660                 665                 670

Leu Leu Glu Tyr Ile Pro Glu Ile Thr Leu Pro Val Ile Ala Ala Leu
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675 680 685

Ser Ile Ala Glu Ser Ser Thr Gln Lys Glu Lys Ile Ile Lys Thr Ile
690 695 700

Asp Asn Phe Leu Glu Lys Arg Tyr Glu Lys Trp Ile Glu Val Tyr Lys
705 710 715 720

Leu Val Lys Ala Lys Trp Leu Gly Thr Val Asn Thr Gln Phe Gln Lys
725 730 735

Arg Ser Tyr Gln Met Tyr Arg Ser Leu Glu Tyr Gln Val Asp Ala Ile
740 745 750

Lys Lys Ile Ile Asp Tyr Glu Tyr Lys Ile Tyr Ser Gly Pro Asp Lys
755 760 765

Glu Gln Ile Ala Asp Glu Ile Asn Asn Leu Lys Asn Lys Leu Glu Glu
770 775 780

Lys Ala Asn Lys Ala Met Ile Asn Ile Asn Ile Phe Met Arg Glu Ser
785 790 795 800

Ser Arg Ser Phe Leu Val Asn Gln Met Ile Asn Glu Ala Lys Lys Gln
805 810 815

Leu Leu Glu Phe Asp Thr Gln Ser Lys Asn Ile Leu Met Gln Tyr Ile
820 825 830

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

Ser Lys Ile Asn Lys Val Phe Ser Thr Pro Ile Pro Phe Ser Tyr Ser
850 855 860

Lys Asn Leu Asp Cys Trp Val Asp Asn Glu Glu Asp Ile Asp Val Ile
865 870 875 880

Leu Lys Lys Ser Thr Ile Leu Asn Leu Asp Ile Asn Asn Asp Ile Ile
885 890 895

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

Gln Leu Val Pro Gly Ile Asn Gly Lys Ala Ile His Leu Val Asn Asn
915 920 925

```
Glu Ser Ser Glu Val Ile Val His Lys Ala Met Asp Ile Glu Tyr Asn
    930                 935                 940

Asp Met Phe Asn Asn Phe Thr Val Ser Phe Trp Leu Arg Val Pro Lys
945                 950                 955                 960

Val Ser Ala Ser His Leu Glu Gln Tyr Gly Thr Asn Glu Tyr Ser Ile
                965                 970                 975

Ile Ser Ser Met Lys Lys His Ser Leu Ser Ile Gly Ser Gly Trp Ser
            980                 985                 990

Val Ser Leu Lys Gly Asn Asn Leu  Ile Trp Thr Leu Lys  Asp Ser Ala
        995                 1000                1005

Gly Glu  Val Arg Gln Ile Thr  Phe Arg Asp Leu Pro  Asp Lys Phe
    1010                1015                1020

Asn Ala  Tyr Leu Ala Asn Lys  Trp Val Phe Ile Thr  Ile Thr Asn
    1025                1030                1035

Asp Arg  Leu Ser Ser Ala Asn  Leu Tyr Ile Asn Gly  Val Leu Met
    1040                1045                1050

Gly Ser  Ala Glu Ile Thr Gly  Leu Gly Ala Ile Arg  Glu Asp Asn
    1055                1060                1065

Asn Ile  Thr Leu Lys Leu Asp  Arg Cys Asn Asn Asn  Asn Gln Tyr
    1070                1075                1080

Val Ser  Ile Asp Lys Phe Arg  Ile Phe Cys Lys Ala  Leu Asn Pro
    1085                1090                1095

Lys Glu  Ile Glu Lys Leu Tyr  Thr Ser Tyr Leu Ser  Ile Thr Phe
    1100                1105                1110

Leu Arg  Asp Phe Trp Gly Asn  Pro Leu Arg Tyr Asp  Thr Glu Tyr
    1115                1120                1125

Tyr Leu  Ile Pro Val Ala Ser  Ser Ser Lys Asp Val  Gln Leu Lys
    1130                1135                1140

Asn Ile  Thr Asp Tyr Met Tyr  Leu Thr Asn Ala Pro  Ser Tyr Thr
    1145                1150                1155

Asn Gly  Lys Leu Asn Ile Tyr  Tyr Arg Arg Leu Tyr  Asn Gly Leu
    1160                1165                1170
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Lys Phe  Ile Ile Lys Arg Tyr  Thr Pro Asn Asn Glu  Ile Asp Ser
    1175                1180                1185

Phe Val  Lys Ser Gly Asp Phe  Ile Lys Leu Tyr Val  Ser Tyr Asn
    1190                1195                1200

Asn Asn  Glu His Ile Val Gly  Tyr Pro Lys Asp Gly  Asn Ala Phe
    1205                1210                1215

Asn Asn  Leu Asp Arg Ile Leu  Arg Val Gly Tyr Asn  Ala Pro Gly
    1220                1225                1230

Ile Pro  Leu Tyr Lys Lys Met  Glu Ala Val Lys Leu  Arg Asp Leu
    1235                1240                1245

Lys Thr  Tyr Ser Val Gln Leu  Lys Leu Tyr Asp Asp  Lys Asn Ala
    1250                1255                1260

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

Pro Asn  Arg Asp Ile Leu Ile  Ala Ser Asn Trp Tyr  Phe Asn His
    1280                1285                1290

Leu Lys  Asp Lys Ile Leu Gly  Cys Asp Trp Tyr Phe  Val Pro Thr
    1295                1300                1305

Asp Glu  Gly Trp Thr Asn Asp
    1310                1315
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<213> Clostridium botulinum

<400> 17

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Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser Lys Thr Lys Ser Leu
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Asp Lys Gly Tyr Asn Lys Ala Leu Asn Asp Leu Cys Ile Lys Val
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<212> PRT
<213> Clostridium botulinum

<400> 18

Ile Gln Met Cys Lys Ser Val Lys Ala Pro Gly Ile Cys Ile Asp Val
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<210> 19
<211> 25
<212> PRT
<213> Clostridium botulinum

<400> 19

Thr Lys Phe Cys His Lys Ala Ile Asp Gly Arg Ser Leu Tyr Asn Lys
1 5 10 15

Thr Leu Asp Cys Arg Glu Leu Leu Val
20 25

<210> 20
<211> 20
<212> PRT
<213> Clostridium botulinum

<400> 20

Thr Lys Val Cys Leu Arg Leu Thr Lys Asn Ser Arg Asp Asp Ser Thr
1 5 10 15

Cys Ile Lys Val
20

<210> 21
<211> 21
<212> PRT
<213> Clostridium botulinum

<400> 21

Ile Arg Phe Cys Lys Asn Ile Val Ser Val Lys Gly Ile Arg Lys Ser
1 5 10 15

Ile Cys Ile Glu Ile
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<210> 22
<211> 23
<212> PRT
<213> Clostridium botulinum

<400> 22

Val Lys Phe Cys Lys Ser Val Ile Pro Arg Lys Gly Thr Lys Ala Pro
1 5 10 15

Pro Arg Leu Cys Ile Arg Val

20

<210> 23
<211> 21
<212> PRT
<213> Clostridium botulinum

<400> 23

Ile Ala Met Cys Lys Pro Val Met Tyr Lys Asn Thr Gly Lys Ser Glu
1 5 10 15

Gln Cys Ile Ile Val
20

<210> 24
<211> 35
<212> PRT
<213> Clostridium tetani

<400> 24

Ile Gly Leu Cys Lys Lys Ile Ile Pro Pro Thr Asn Ile Arg Glu Asn
1 5 10 15

Leu Tyr Asn Arg Thr Ala Ser Leu Thr Asp Leu Gly Gly Glu Leu Cys
20 25 30

Ile Lys Ile
35

<210> 25
<211> 7
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 25

Ala Leu Ala Pro Tyr Ile Pro
1 5

<210> 26
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 26

Glu Thr Phe Ser Asp Leu Trp Lys Leu Leu Pro Glu
1 5 10

<210> 27
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 27

Thr Ser Phe Ala Glu Tyr Trp Asn Leu Leu Ser Pro
1 5 10

<210> 28
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 28

Leu Thr Phe Glu His Tyr Trp Ala Gln Leu Thr Ser
1 5 10

<210> 29
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 29

Leu Thr Phe Glu His Trp Trp Ala Gln Leu Thr Ser
1 5 10

<210> 30
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 30

Leu Thr Phe Glu His Ser Trp Ala Gln Leu Thr Ser
1 5 10

<210> 31
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 31

Glu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser

1 5 10

<210> 32
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 32

Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser
1 5 10

<210> 33
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 33

Leu Thr Phe Glu His Trp Trp Ala Ser Leu Thr Ser
1 5 10

<210> 34
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 34

Leu Thr Phe Glu His Trp Trp Ser Ser Leu Thr Ser
1 5 10

<210> 35
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 35

Leu Thr Phe Thr His Trp Trp Ala Gln Leu Thr Ser
1 5 10

<210> 36
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 36

Glu Thr Phe Glu His Trp Trp Ala Gln Leu Thr Ser
1 5 10

<210> 37
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 37

Leu Thr Phe Glu His Trp Trp Ser Gln Leu Thr Ser
1 5 10

<210> 38
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 38

Leu Thr Phe Glu His Trp Trp Ala Gln Leu Leu Ser
1 5 10

<210> 39
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 39

Glu Thr Phe Glu His Trp Trp Ser Gln Leu Leu Ser
1 5 10

<210> 40
<211> 9
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 40

Arg Phe Met Asp Tyr Trp Glu Gly Leu
1 5

<210> 41
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 41

Met Pro Arg Phe Met Asp Tyr Trp Glu Gly Leu Asn
1 5 10

<210> 42
<211> 15
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 42

Ser Gln Glu Thr Phe Ser Asp Leu Trp Lys Leu Leu Pro Glu Asn
1 5 10 15

<210> 43
<211> 12
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<220>
<221> misc_feature
<222> (1)..(2)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (4)..(6)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (8)..(9)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (11)..(12)
<223> Xaa can be any naturally occurring amino acid

<400> 43

Xaa Xaa Phe Xaa Xaa Xaa Trp Xaa Xaa Leu Xaa Xaa
1 5 10

<210> 44
<211> 14
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 44

Glu Leu Glu Ser Pro Pro Pro Pro Tyr Ser Arg Tyr Pro Met
1 5 10

<210> 45
<211> 7
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 45

Lys Val Gly Phe Phe Lys Arg
1 5

<210> 46
<211> 10
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 46

Leu Leu Val Arg Gly Arg Thr Leu Val Val
1 5 10

<210> 47
<211> 10
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<400> 47

Asp Arg His Asp Ser Gly Leu Asp Ser Met
1 5 10

<210> 48
<211> 7
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<220>
<221> misc_feature
<222> (2)..(2)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (4)..(4)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (6)..(6)

<223> Xaa can be any naturally occurring amino acid

<400> 48

Pro Xaa Ala Xaa Val Xaa Pro
1   5

<210> 49
<211> 7
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<220>
<221> misc_feature
<222> (5)..(6)
<223> Xaa can be any naturally occurring amino acid

<400> 49

Pro Pro Xaa Tyr Xaa Xaa Met
1   5

<210> 50
<211> 4
<212> PRT
<213> artificial sequence
<220>
<223> ligase recognition motif

<220>
<221> misc_feature
<222> (3)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 50

Pro Pro Xaa Tyr
1

<210> 51
<211> 3819
<212> DNA
<213> Artificial

<220>
<223> recombinant protein BONT/E with MDM2 binding motif

<400> 51
atgccgaaaa tcaacagctt caactataac gatccggtga acgatcgtac catcctgtat   60

attaaaccgg gcggttgcca ggaattttac aaaagcttca acatcatgaa aaacatctgg   120

attattccgg aacgtaacgt gattggcacc accccgcagg attttcatcc gccgaccagc 180

ctgaaaaacg gcgatagcag ctattatgat ccgaactatc tgcagtctga tgaagaaaaa 240

gatcgcttcc tgaaaatcgt gaccaaaatc ttcaaccgca tcaacaacaa cctgagcggc 300

ggcattctgc tggaagaact gagcaaagcg aatccgtatc tgggcaacga taacactcca 360

gataaccagt ttcatattgg tgatgcgagc gcggtggaaa ttaaatttag caacggctct 420

caggacattc tgctgccgaa cgtgattatt atgggcgcgg aaccggacct gtttgaaacc 480

aacagcagca acattagcct gcgtaacaac tatatgccga gcaaccatgg ttttggcagc 540

attgcgattg tgacctttag cccggaatat agctttcgct tcaacgataa cagcatgaac 600

gaatttattc aggacccggc gctgaccctg atgcacgagc tgattcatag cctgcatggc 660

ctgtatggcg cgaaaggcat taccaccaaa tataccatca cccagaaaca gaatccgctg 720

attaccaaca ttcgtggcac caacattgaa gaatttctga cctttggcgg caccgatctg 780

aacattatta ccagcgcgca gagcaacgat atctatacca acctgctggc cgattataaa 840

aaaatcgcgt ctaaactgag caaagtgcag gtgagcaatc cgctgctgaa tccgtataaa 900

gatgtgtttg aagcgaaata tggcctggat aaagatgcta gcggcattta tagcgtgaac 960

atcaacaaat tcaacgacat cttcaaaaaa ctgtatagct ttaccgaatt tgatctggcc 1020

accaaatttc aggtgaaatg ccgccagacc tatattggcc agtataaata ttttaaactg 1080

agcaacctgc tgaacgatag catttacaac atcagcgaag gctataacat caacaacctg 1140

aaagtgaact ttcgtggcca gaacgcgaat ttaaatccgc gtattattac cccgattacc 1200

ggccgtggac tagtgaaaaa aattatccgt ttttgcgtgc gtggcattat caccagcctg 1260

acctttgaac ataattgggc acagctgacc agcaaaagcc tggtgccgcg tggcagcaaa 1320

gcgttaaatg atttatgcat cgaaatcaac aacggcgaac tgtttttttgt ggcgagcgaa 1380

aacagctata acgatgataa catcaacacc ccgaaagaaa ttgatgatac cgtgaccagc 1440

aataacaact acgaaaacga tctggatcag gtgattctga actttaacag cgaaagcgca 1500

ccgggcctgt ctgatgaaaa actgaacctg accattcaga acgatgcgta tatcccgaaa 1560

tatgatagca acggcaccag cgatattgaa cagcatgatg tgaacgaact gaacgtgttt 1620

ttttatctgg atgcgcagaa agtgccggaa ggcgaaaaca acgtgaatct gaccagctca 1680

attgataccg cgctgctgga acagccgaaa atctatacct tttttagcag cgaattcatc 1740

aacaacgtga acaaaccggt gcaggcggcg ctgtttgtga gctggattca gcaggtgctg 1800

gttgatttta ccaccgaagc gaaccagaaa agcaccgtgg ataaaattgc ggatattagc 1860

attgtggtgc cgtatattgg cctggccctg aacattggca acgaagcgca gaaaggcaac 1920

tttaaagatg cgctggaact gctgggtgcg ggcattctgc tggaatttga accggaactg 1980

ctgattccga ccattctggt gtttaccatc aaaagctttc tgggcagcag cgataacaaa 2040

aacaaagtga tcaaagcgat taacaacgcg ctgaaagaac gtgatgaaaa atggaaagaa 2100

gtgtatagct tcattgtgtc taactggatg accaaaatca acacccagtt caacaaacgt 2160

aaagaacaaa tgtatcaggc gctgcagaac caggtgaacg cgattaaaac catcatcgaa 2220

agcaaataca acagctacac cctggaagaa aaaaacgaac tgaccaacaa atatgacatc 2280

aaacaaatcg aaaatgaact gaaccagaaa gtgagcattg ccatgaacaa cattgatcgc 2340

tttctgaccg aaagcagcat tagctacctg atgaaactga tcaacgaagt gaaaatcaac 2400

aaactgcgcg aatatgatga aaacgtgaaa acctacctgc tgaactatat tattcagcat 2460

ggcagcattc tgggcgaaag ccagcaagaa ctgaacagca tggttaccga taccctgaac 2520

aacagcattc cgtttaaact gagcagctac accgatgata aaatcctgat cagctacttc 2580

aacaaattct tcaaacgcat caaaagcagc agcgtgctga acatgcgtta taaaaacgat 2640

aaatacgtag ataccagcgg ctatgatagc aatatcaaca ttaacggtga tgtgtataaa 2700

tacccgacca acaaaaacca gttcggcatc tacaacgata aactgagcga agtgaacatt 2760

agccagaacg attatatcat ctacgataat aaatataaaa acttcagcat cagcttttgg 2820

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aactgcatgc gtgataacaa cagcggctgg aaagtgagcc tgaaccataa cgaaatcatc 2940

tggaccctgc aggataacgc cggcattaac cagaaactgg cctttaacta tggcaacgcg 3000

aacggcatta gcgattacat caacaaatgg atctttgtga ccattaccaa cgatcgtctg 3060

ggcgatagca aactgtatat taacggcaac ctgatcgacc agaaaagcat tctgaacctg 3120

ggcaacattc atgtgagcga taacatcctg ttcaaaattg tgaactgcag ctatacccgt 3180

tatattggca tccgctattt caacatcttc gataaagaac tggatgaaac cgaaattcag 3240

accctgtata gcaacgaacc gaacaccaac atcctgaaag atttctgggg caactatctg 3300

ctgtacgata aagaatatta tctgctgaac gtgctgaaac cgaacaactt tattgatcgc 3360

cgtaaagata gcaccctgag cattaacaac attcgtagca ccattctgct ggccaaccgt 3420

ctgtatagcg gcattaaagt gaaaattcag cgcgtgaaca atagcagcac caacgataac 3480

ctggtgcgta aaaacgatca ggtgtatatc aactttgtgg ccagcaaaac ccacctgttt 3540

ccgctgtatg cggataccgc gaccaccaac aaagaaaaaa ccattaaaat cagcagcagc 3600

ggcaaccgtt ttaaccaggt ggtggtgatg aacagcgtgg gcaacaactg tacaatgaac 3660

ttcaaaaaca acaacggcaa caacattggc ctgctgggct ttaaagcgga taccgtggtg 3720

gcgagcacct ggtattatac ccacatgcgt gatcatacca acagcaacgg ctgcttttgg 3780

aactttatta gcgaagaaca tggctggcag gaaaaatga 3819

<210> 52
<211> 1272
<212> PRT
<213> artificial

<220>
<223> recombinant protein BONT/E with MDM2 binding motif

<400> 52

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130 135 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165 170 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
180 185 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
195 200 205

```
Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460
```

```
Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720
```

```
Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
```

965 970 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala Asn Gly Ile Ser Asp Tyr Ile Asn
995 1000 1005

Lys Trp Ile Phe Val Thr Ile Thr Asn Asp Arg Leu Gly Asp Ser
1010 1015 1020

Lys Leu Tyr Ile Asn Gly Asn Leu Ile Asp Gln Lys Ser Ile Leu
1025 1030 1035

Asn Leu Gly Asn Ile His Val Ser Asp Asn Ile Leu Phe Lys Ile
1040 1045 1050

Val Asn Cys Ser Tyr Thr Arg Tyr Ile Gly Ile Arg Tyr Phe Asn
1055 1060 1065

Ile Phe Asp Lys Glu Leu Asp Glu Thr Glu Ile Gln Thr Leu Tyr
1070 1075 1080

Ser Asn Glu Pro Asn Thr Asn Ile Leu Lys Asp Phe Trp Gly Asn
1085 1090 1095

Tyr Leu Leu Tyr Asp Lys Glu Tyr Tyr Leu Leu Asn Val Leu Lys
1100 1105 1110

Pro Asn Asn Phe Ile Asp Arg Arg Lys Asp Ser Thr Leu Ser Ile
1115 1120 1125

Asn Asn Ile Arg Ser Thr Ile Leu Leu Ala Asn Arg Leu Tyr Ser
1130 1135 1140

Gly Ile Lys Val Lys Ile Gln Arg Val Asn Asn Ser Ser Thr Asn
1145 1150 1155

Asp Asn Leu Val Arg Lys Asn Asp Gln Val Tyr Ile Asn Phe Val
1160 1165 1170

Ala Ser Lys Thr His Leu Phe Pro Leu Tyr Ala Asp Thr Ala Thr
1175 1180 1185

Thr Asn Lys Glu Lys Thr Ile Lys Ile Ser Ser Ser Gly Asn Arg
1190 1195 1200

```
Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                 1210                 1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                 1225                 1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                 1240                 1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                 1255                 1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                 1270
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<210> 53
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 53

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Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Lys Lys Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140
```

```
Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
145                 150                 155                 160

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400
```

```
Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
```

645 650 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
660 665 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
675 680 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
690 695 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705 710 715 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
725 730 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
740 745 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
755 760 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
770 775 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785 790 795 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
805 810 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
820 825 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
835 840 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
850 855 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865 870 875 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
885 890 895

```
Asp Val Tyr Lys Tyr Pro Thr Asn Lys Asn Gln Phe Gly Ile Tyr Asn
            900                 905                 910

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140
```

```
Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 54
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 54

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Lys Lys Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80
```

```
Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335
```

```
Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
```

```
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830
```

```
Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080
```

```
Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 55
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 55

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15
```

```
Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Lys Lys Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270
```

```
Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
```

515 520 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
530 535 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545 550 555 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
580 585 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
595 600 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
610 615 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625 630 635 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
645 650 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
660 665 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
675 680 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
690 695 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705 710 715 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
725 730 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
740 745 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
755 760 765

```
Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020
```

```
Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260
```

Ser Glu Glu His Gly Trp Gln Glu Lys
    1265   1270

<210> 56
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 56

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1   5   10   15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20   25   30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35   40   45

Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50   55   60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65   70   75   80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85   90   95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100   105   110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115   120   125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130   135   140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165   170   175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180   185   190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195   200   205

```
Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
```

```
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700
```

```
Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960
```

```
Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
               965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
       995                1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200
```

```
Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                 1210                 1215


Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                 1225                 1230


Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                 1240                 1245


Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                 1255                 1260


Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                 1270
```

<210> 57
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 57

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15


Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30


Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45


Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60


Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80


Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95


Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110


Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125


Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140
```

```
Leu Pro Asn Val Ile Ile Met Gly Ala Glu Pro Asp Leu Phe Glu Thr
145                 150                 155                 160

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Lys Ile Ile Thr Pro Ile Lys
```

385 390 395 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
405 410 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
420 425 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
435 440 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
450 455 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465 470 475 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
485 490 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
500 505 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
515 520 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
530 535 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545 550 555 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
580 585 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
595 600 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
610 615 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625 630 635 640

eolf-seql

```
Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
               645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
           660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
       675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
   690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
               725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
           740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
       755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
   770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
               805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
           820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
       835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
   850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
               885                 890                 895
```

```
Asp Val Tyr Lys Tyr Pro Thr Asn Lys Asn Gln Phe Gly Ile Tyr Asn
            900                 905                 910

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140
```

```
Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 58
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 58

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80
```

```
Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
```

325 330 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
340 345 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
355 360 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
370 375 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385 390 395 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
405 410 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
420 425 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
435 440 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
450 455 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465 470 475 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
485 490 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
500 505 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
515 520 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
530 535 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545 550 555 560

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

```
Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830
```

```
Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080
```

```
Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 59
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 59

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15
```

```
Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
```

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            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Lys
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510
```

```
Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765
```

```
Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020
```

```
Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
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1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

<210> 60
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 60

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130 135 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165 170 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
180 185 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu

```
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Lys
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445
```

```
Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700
```

```
Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960
```

```
Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
```

1190 1195 1200

Phe Asn Gln Val Val Val Met Asn Ser Val Gly Asn Asn Cys Thr
1205 1210 1215

Met Asn Phe Lys Asn Asn Asn Gly Asn Asn Ile Gly Leu Leu Gly
1220 1225 1230

Phe Lys Ala Asp Thr Val Val Ala Ser Thr Trp Tyr Tyr Thr His
1235 1240 1245

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

<210> 61
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 61

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu

```
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380
```

```
Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640
```

```
Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
               645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
               725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
               805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
               885                 890                 895
```

```
Asp Val Tyr Lys Tyr Pro Thr Asn Lys Asn Gln Phe Gly Ile Tyr Asn
            900                 905                 910

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
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1130 1135 1140

Gly Ile Lys Val Lys Ile Gln Arg Val Asn Asn Ser Ser Thr Asn
1145 1150 1155

Asp Asn Leu Val Arg Lys Asn Asp Gln Val Tyr Ile Asn Phe Val
1160 1165 1170

Ala Ser Lys Thr His Leu Phe Pro Leu Tyr Ala Asp Thr Ala Thr
1175 1180 1185

Thr Asn Lys Glu Lys Thr Ile Lys Ile Ser Ser Ser Gly Asn Arg
1190 1195 1200

Phe Asn Gln Val Val Val Met Asn Ser Val Gly Asn Asn Cys Thr
1205 1210 1215

Met Asn Phe Lys Asn Asn Asn Gly Asn Asn Ile Gly Leu Leu Gly
1220 1225 1230

Phe Lys Ala Asp Thr Val Val Ala Ser Thr Trp Tyr Tyr Thr His
1235 1240 1245

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

<210> 62
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 62

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys

```
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320
```

```
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Lys
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

Ile Asp Thr Ala Leu Leu Glu Gln Pro Lys Ile Tyr Thr Phe Phe Ser
                565                 570                 575
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Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830
```

```
Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
```

1070 1075 1080

Ser Asn Glu Pro Asn Thr Asn Ile Leu Lys Asp Phe Trp Gly Asn
1085 1090 1095

Tyr Leu Leu Tyr Asp Lys Glu Tyr Tyr Leu Leu Asn Val Leu Lys
1100 1105 1110

Pro Asn Asn Phe Ile Asp Arg Arg Lys Asp Ser Thr Leu Ser Ile
1115 1120 1125

Asn Asn Ile Arg Ser Thr Ile Leu Leu Ala Asn Arg Leu Tyr Ser
1130 1135 1140

Gly Ile Lys Val Lys Ile Gln Arg Val Asn Asn Ser Ser Thr Asn
1145 1150 1155

Asp Asn Leu Val Arg Lys Asn Asp Gln Val Tyr Ile Asn Phe Val
1160 1165 1170

Ala Ser Lys Thr His Leu Phe Pro Leu Tyr Ala Asp Thr Ala Thr
1175 1180 1185

Thr Asn Lys Glu Lys Thr Ile Lys Ile Ser Ser Ser Gly Asn Arg
1190 1195 1200

Phe Asn Gln Val Val Val Met Asn Ser Val Gly Asn Asn Cys Thr
1205 1210 1215

Met Asn Phe Lys Asn Asn Asn Gly Asn Asn Ile Gly Leu Leu Gly
1220 1225 1230

Phe Lys Ala Asp Thr Val Val Ala Ser Thr Trp Tyr Tyr Thr His
1235 1240 1245

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

<210> 63
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 63

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg

```
1               5                   10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255
```

```
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Lys Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510
```

```
Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765
```

```
Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
```

```
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245
```

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
    1250   1255   1260

Ser Glu Glu His Gly Trp Gln Glu Lys
    1265   1270

<210> 64
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 64

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1   5   10   15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20   25   30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35   40   45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50   55   60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65   70   75   80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85   90   95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100   105   110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115   120   125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130   135   140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165   170   175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180   185   190

```
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Lys Ile Ile Thr Pro Ile Lys
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445
```

```
Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700
```

```
Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
```

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                                    eolf-seql
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185
```

```
Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser  Gly Asn Arg
    1190                1195                1200


Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215


Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230


Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245


Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260


Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 65
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 65

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15


Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30


Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45


Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60


Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80


Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95


Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110


Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125
```

```
Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Asn Leu Lys Val Asn Phe
    370                 375                 380
```

```
Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640
```

```
Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

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

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885 890 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
915 920 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
930 935 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945 950 955 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
965 970 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala Asn Gly Ile Ser Asp Tyr Ile Asn
995 1000 1005

Lys Trp Ile Phe Val Thr Ile Thr Asn Asp Arg Leu Gly Asp Ser
1010 1015 1020

Lys Leu Tyr Ile Asn Gly Asn Leu Ile Asp Gln Lys Ser Ile Leu
1025 1030 1035

Asn Leu Gly Asn Ile His Val Ser Asp Asn Ile Leu Phe Lys Ile
1040 1045 1050

Val Asn Cys Ser Tyr Thr Arg Tyr Ile Gly Ile Arg Tyr Phe Asn
1055 1060 1065

Ile Phe Asp Lys Glu Leu Asp Glu Thr Glu Ile Gln Thr Leu Tyr
1070 1075 1080

Ser Asn Glu Pro Asn Thr Asn Ile Leu Lys Asp Phe Trp Gly Asn
1085 1090 1095

Tyr Leu Leu Tyr Asp Lys Glu Tyr Tyr Leu Leu Asn Val Leu Lys
1100 1105 1110

Pro Asn Asn Phe Ile Asp Arg Arg Lys Asp Ser Thr Leu Ser Ile
1115 1120 1125

```
Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 66
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 66

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60
```

```
Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320
```

```
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

Ile Asp Thr Ala Leu Leu Glu Gln Pro Lys Ile Tyr Thr Phe Phe Ser
                565                 570                 575
```

```
Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
```

```
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065
```

```
Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 67
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 67

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255
```

```
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Lys Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510
```

```
Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
```

```
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005
```

```
Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245
```

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
    1250   1255   1260

Ser Glu Glu His Gly Trp Gln Glu Lys
    1265   1270

<210> 68
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 68

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1   5   10   15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20   25   30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35   40   45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50   55   60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65   70   75   80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85   90   95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100   105   110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115   120   125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130   135   140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165   170   175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180   185   190

```
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Lys Lys Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445
```

```
Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
```

690 695 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705 710 715 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
725 730 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
740 745 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
755 760 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
770 775 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785 790 795 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
805 810 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
820 825 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
835 840 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
850 855 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865 870 875 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
885 890 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
915 920 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
930 935 940

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Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185
```

```
Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                 1195                 1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                 1210                 1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                 1225                 1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                 1240                 1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                 1255                 1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                 1270
```

<210> 69
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 69

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125
```

```
Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Lys Lys Phe
    370                 375                 380
```

```
Arg Gly Gln Asn Ala Asn Lys Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
```

```
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880
```

```
Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125
```

```
Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                 1135                 1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                 1150                 1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                 1165                 1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                 1180                 1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                 1195                 1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                 1210                 1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                 1225                 1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                 1240                 1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                 1255                 1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                 1270
```

<210> 70
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 70

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60
```

```
Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320
```

```
Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Lys Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Lys Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

Ile Asp Thr Ala Leu Leu Glu Gln Pro Lys Ile Tyr Thr Phe Phe Ser
```

565 570 575

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
580 585 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
595 600 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
610 615 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625 630 635 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
645 650 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
660 665 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
675 680 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
690 695 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705 710 715 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
725 730 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
740 745 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
755 760 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
770 775 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785 790 795 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
805 810 815

```
Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065
```

```
Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 71
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 71

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255
```

```
Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Lys Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
```

```
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750
```

```
Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005
```

```
Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245
```

```
Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 72
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 72

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Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190
```

```
Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Lys Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Lys Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
```

```
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685
```

eolf-seql

```
Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940
```

```
Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185
```

```
Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                 1195                 1200


Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                 1210                 1215


Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                 1225                 1230


Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                 1240                 1245


Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                 1255                 1260


Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                 1270


<210>  73
<211>  1272
<212>  PRT
<213>  Clostridium botulinum

<400>  73

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                   10                  15


Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30


Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45


Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60


Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80


Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95


Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110


Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125
```

```
Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
```

```
    370                 375                 380

Arg Gly Gln Asn Ala Asn Lys Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620
```

```
Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880
```

```
Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125
```

```
Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                 1135                 1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                 1150                 1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                 1165                 1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                 1180                 1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                 1195                 1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                 1210                 1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                 1225                 1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                 1240                 1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                 1255                 1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                 1270
```

<210> 74
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 74

```
Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1               5                  10                  15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
            20                  25                  30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
        35                  40                  45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
    50                  55                  60
```

```
Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
```

```
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Lys Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560
```

```
Ile Asp Thr Ala Leu Leu Glu Gln Pro Lys Ile Tyr Thr Phe Phe Ser
                565                 570                 575

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815
```

```
Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065
```

```
Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
```

<210> 75
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 75

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130 135 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165 170 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
180 185 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
195 200 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
210 215 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly

```
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Lys
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495
```

```
Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750
```

```
Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005
```

```
Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
```

1235 1240 1245

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

<210> 76
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 76

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
1 5 10 15

Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130 135 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165 170 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe

```
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430
```

```
Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685
```

```
Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940
```

```
Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170

Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
```

1175 1180 1185

Thr Asn Lys Glu Lys Thr Ile Lys Ile Ser Ser Ser Gly Asn Arg
1190 1195 1200

Phe Asn Gln Val Val Val Met Asn Ser Val Gly Asn Asn Cys Thr
1205 1210 1215

Met Asn Phe Lys Asn Asn Asn Gly Asn Asn Ile Gly Leu Leu Gly
1220 1225 1230

Phe Lys Ala Asp Thr Val Val Ala Ser Thr Trp Tyr Tyr Thr His
1235 1240 1245

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

<210> 77
<211> 1272
<212> PRT
<213> Clostridium botulinum

<400> 77

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
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Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Lys Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Lys Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp

```
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365
```

```
Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Lys Lys Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Lys
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Thr Ser Lys
            420                 425                 430

Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620
```

```
Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
        675                 680                 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
    690                 695                 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705                 710                 715                 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
                725                 730                 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
            740                 745                 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
        755                 760                 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
    770                 775                 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785                 790                 795                 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
                805                 810                 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
            820                 825                 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
        835                 840                 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
    850                 855                 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865                 870                 875                 880
```

```
Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
                885                 890                 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
        915                 920                 925

Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
```

1115 1120 1125

Asn Asn Ile Arg Ser Thr Ile Leu Leu Ala Asn Arg Leu Tyr Ser
1130 1135 1140

Gly Ile Lys Val Lys Ile Gln Arg Val Asn Asn Ser Ser Thr Asn
1145 1150 1155

Asp Asn Leu Val Arg Lys Asn Asp Gln Val Tyr Ile Asn Phe Val
1160 1165 1170

Ala Ser Lys Thr His Leu Phe Pro Leu Tyr Ala Asp Thr Ala Thr
1175 1180 1185

Thr Asn Lys Glu Lys Thr Ile Lys Ile Ser Ser Ser Gly Asn Arg
1190 1195 1200

Phe Asn Gln Val Val Val Met Asn Ser Val Gly Asn Asn Cys Thr
1205 1210 1215

Met Asn Phe Lys Asn Asn Asn Gly Asn Asn Ile Gly Leu Leu Gly
1220 1225 1230

Phe Lys Ala Asp Thr Val Val Ala Ser Thr Trp Tyr Tyr Thr His
1235 1240 1245

Met Arg Asp His Thr Asn Ser Asn Gly Cys Phe Trp Asn Phe Ile
1250 1255 1260

Ser Glu Glu His Gly Trp Gln Glu Lys
1265 1270

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<213> artificial sequence
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<223> ligase recognition motif

<400> 78

Leu Thr Phe Glu His Asn Trp Ala Gln Leu Glu Asn
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<210> 79
<211> 3819
<212> DNA
<213> Artificial

<220>
<223> recombinant protein BONT/E with MDM2 binding motif

<400> 79

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attattccgg aacgtaacgt gattggcacc accccgcagg attttcatcc gccgaccagc 180

ctgaaaaacg gcgatagcag ctattatgat ccgaactatc tgcagtctga tgaagaaaaa 240

gatcgcttcc tgaaaatcgt gaccaaaatc ttcaaccgca tcaacaacaa cctgagcggc 300

ggcattctgc tggaagaact gagcaaagcg aatccgtatc tgggcaacga taacactcca 360

gataaccagt ttcatattgg tgatgcgagc gcggtggaaa ttaaatttag caacggctct 420

caggacattc tgctgccgaa cgtgattatt atgggcgcgg aaccggacct gtttgaaacc 480

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gaatttattc aggacccggc gctgaccctg atgcacgagc tgattcatag cctgcatggc 660

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ttcaaaaaca acaacggcaa caacattggc ctgctgggct ttaaagcgga taccgtggtg 3720

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<223> recombinant protein BONT/E with MDM2 binding motif

<400> 80

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Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65 70 75 80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
85 90 95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
100 105 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
115 120 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
130 135 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
165 170 175

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Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320

Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Leu Thr Phe Glu His Asn Trp Ala Gln Leu Glu Asn Lys
            420                 425                 430
```

```
Ser Leu Val Pro Arg Gly Ser Lys Ala Leu Asn Asp Leu Cys Ile Glu
        435                 440                 445

Ile Asn Asn Gly Glu Leu Phe Phe Val Ala Ser Glu Asn Ser Tyr Asn
    450                 455                 460

Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile Asp Asp Thr Val Thr Ser
465                 470                 475                 480

Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln Val Ile Leu Asn Phe Asn
                485                 490                 495

Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu Lys Leu Asn Leu Thr Ile
            500                 505                 510

Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp Ser Asn Gly Thr Ser Asp
        515                 520                 525

Ile Glu Gln His Asp Val Asn Glu Leu Asn Val Phe Phe Tyr Leu Asp
    530                 535                 540

Ala Gln Lys Val Pro Glu Gly Glu Asn Asn Val Asn Leu Thr Ser Ser
545                 550                 555                 560

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

Ser Glu Phe Ile Asn Asn Val Asn Lys Pro Val Gln Ala Ala Leu Phe
            580                 585                 590

Val Ser Trp Ile Gln Gln Val Leu Val Asp Phe Thr Thr Glu Ala Asn
        595                 600                 605

Gln Lys Ser Thr Val Asp Lys Ile Ala Asp Ile Ser Ile Val Val Pro
    610                 615                 620

Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn Glu Ala Gln Lys Gly Asn
625                 630                 635                 640

Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe
                645                 650                 655

Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu Val Phe Thr Ile Lys Ser
            660                 665                 670

Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys Val Ile Lys Ala Ile Asn
```

675 680 685

Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp Lys Glu Val Tyr Ser Phe
690 695 700

Ile Val Ser Asn Trp Met Thr Lys Ile Asn Thr Gln Phe Asn Lys Arg
705 710 715 720

Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn Gln Val Asn Ala Ile Lys
725 730 735

Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr Thr Leu Glu Glu Lys Asn
740 745 750

Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln Ile Glu Asn Glu Leu Asn
755 760 765

Gln Lys Val Ser Ile Ala Met Asn Asn Ile Asp Arg Phe Leu Thr Glu
770 775 780

Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile Asn Glu Val Lys Ile Asn
785 790 795 800

Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys Thr Tyr Leu Leu Asn Tyr
805 810 815

Ile Ile Gln His Gly Ser Ile Leu Gly Glu Ser Gln Gln Glu Leu Asn
820 825 830

Ser Met Val Thr Asp Thr Leu Asn Asn Ser Ile Pro Phe Lys Leu Ser
835 840 845

Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser Tyr Phe Asn Lys Phe Phe
850 855 860

Lys Arg Ile Lys Ser Ser Ser Val Leu Asn Met Arg Tyr Lys Asn Asp
865 870 875 880

Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser Asn Ile Asn Ile Asn Gly
885 890 895

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

Asp Lys Leu Ser Glu Val Asn Ile Ser Gln Asn Asp Tyr Ile Ile Tyr
915 920 925

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Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser Phe Trp Val Arg Ile Pro
    930                 935                 940

Asn Tyr Asp Asn Lys Ile Val Asn Val Asn Asn Glu Tyr Thr Ile Ile
945                 950                 955                 960

Asn Cys Met Arg Asp Asn Asn Ser Gly Trp Lys Val Ser Leu Asn His
                965                 970                 975

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

Leu Ala Phe Asn Tyr Gly Asn Ala  Asn Gly Ile Ser Asp  Tyr Ile Asn
        995                 1000                1005

Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp Arg Leu  Gly Asp Ser
    1010                1015                1020

Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp Gln Lys  Ser Ile Leu
    1025                1030                1035

Asn Leu  Gly Asn Ile His Val  Ser Asp Asn Ile Leu  Phe Lys Ile
    1040                1045                1050

Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly Ile Arg  Tyr Phe Asn
    1055                1060                1065

Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu Ile Gln  Thr Leu Tyr
    1070                1075                1080

Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys Asp Phe  Trp Gly Asn
    1085                1090                1095

Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu Leu Asn  Val Leu Lys
    1100                1105                1110

Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp Ser Thr  Leu Ser Ile
    1115                1120                1125

Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala Asn Arg  Leu Tyr Ser
    1130                1135                1140

Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn Asn Ser  Ser Thr Asn
    1145                1150                1155

Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val Tyr Ile  Asn Phe Val
    1160                1165                1170
```

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Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr Ala Asp  Thr Ala Thr
    1175                1180                1185

Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser Ser Ser  Gly Asn Arg
    1190                1195                1200

Phe Asn  Gln Val Val Val Met  Asn Ser Val Gly Asn  Asn Cys Thr
    1205                1210                1215

Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn Ile Gly  Leu Leu Gly
    1220                1225                1230

Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr Trp Tyr  Tyr Thr His
    1235                1240                1245

Met Arg  Asp His Thr Asn Ser  Asn Gly Cys Phe Trp  Asn Phe Ile
    1250                1255                1260

Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1265                1270
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<210> 81
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ctgaaaaacg gcgatagcag ctattatgat ccgaactatc tgcagtctga tgaagaaaaa    240
gatcgcttcc tgaaaatcgt gaccaaaatc ttcaaccgca tcaacaacaa cctgagcggc    300
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gaatttattc aggacccggc gctgaccctg atgcacgagc tgattcatag cctgcatggc    660
ctgtatggcg cgaaaggcat taccaccaaa tataccatca cccagaaaca gaatccgctg    720
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accaaatttc aggtgaaatg ccgccagacc tatattggcc agtataaata ttttaaactg 1080

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<210> 82
<211> 1262
<212> PRT
<213> Clostridium botulinum

<400> 82

Met Pro Lys Ile Asn Ser Phe Asn Tyr Asn Asp Pro Val Asn Asp Arg
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Thr Ile Leu Tyr Ile Lys Pro Gly Gly Cys Gln Glu Phe Tyr Lys Ser
20 25 30

Phe Asn Ile Met Lys Asn Ile Trp Ile Ile Pro Glu Arg Asn Val Ile
35 40 45

Gly Thr Thr Pro Gln Asp Phe His Pro Pro Thr Ser Leu Lys Asn Gly
50 55 60

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Asp Ser Ser Tyr Tyr Asp Pro Asn Tyr Leu Gln Ser Asp Glu Glu Lys
65                  70                  75                  80

Asp Arg Phe Leu Lys Ile Val Thr Lys Ile Phe Asn Arg Ile Asn Asn
                85                  90                  95

Asn Leu Ser Gly Gly Ile Leu Leu Glu Glu Leu Ser Lys Ala Asn Pro
            100                 105                 110

Tyr Leu Gly Asn Asp Asn Thr Pro Asp Asn Gln Phe His Ile Gly Asp
        115                 120                 125

Ala Ser Ala Val Glu Ile Lys Phe Ser Asn Gly Ser Gln Asp Ile Leu
    130                 135                 140

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

Asn Ser Ser Asn Ile Ser Leu Arg Asn Asn Tyr Met Pro Ser Asn His
                165                 170                 175

Gly Phe Gly Ser Ile Ala Ile Val Thr Phe Ser Pro Glu Tyr Ser Phe
            180                 185                 190

Arg Phe Asn Asp Asn Ser Met Asn Glu Phe Ile Gln Asp Pro Ala Leu
        195                 200                 205

Thr Leu Met His Glu Leu Ile His Ser Leu His Gly Leu Tyr Gly Ala
    210                 215                 220

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

Ile Thr Asn Ile Arg Gly Thr Asn Ile Glu Glu Phe Leu Thr Phe Gly
                245                 250                 255

Gly Thr Asp Leu Asn Ile Ile Thr Ser Ala Gln Ser Asn Asp Ile Tyr
            260                 265                 270

Thr Asn Leu Leu Ala Asp Tyr Lys Lys Ile Ala Ser Lys Leu Ser Lys
        275                 280                 285

Val Gln Val Ser Asn Pro Leu Leu Asn Pro Tyr Lys Asp Val Phe Glu
    290                 295                 300

Ala Lys Tyr Gly Leu Asp Lys Asp Ala Ser Gly Ile Tyr Ser Val Asn
305                 310                 315                 320
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Ile Asn Lys Phe Asn Asp Ile Phe Lys Lys Leu Tyr Ser Phe Thr Glu
                325                 330                 335

Phe Asp Leu Ala Thr Lys Phe Gln Val Lys Cys Arg Gln Thr Tyr Ile
            340                 345                 350

Gly Gln Tyr Lys Tyr Phe Lys Leu Ser Asn Leu Leu Asn Asp Ser Ile
        355                 360                 365

Tyr Asn Ile Ser Glu Gly Tyr Asn Ile Asn Asn Leu Lys Val Asn Phe
    370                 375                 380

Arg Gly Gln Asn Ala Asn Leu Asn Pro Arg Ile Ile Thr Pro Ile Thr
385                 390                 395                 400

Gly Arg Gly Leu Val Lys Lys Ile Ile Arg Phe Cys Val Arg Gly Ile
                405                 410                 415

Ile Thr Ser Lys Thr Lys Ser Leu Val Pro Arg Gly Ser Lys Ala Leu
            420                 425                 430

Asn Asp Leu Cys Ile Glu Ile Asn Asn Gly Glu Leu Phe Phe Val Ala
        435                 440                 445

Ser Glu Asn Ser Tyr Asn Asp Asp Asn Ile Asn Thr Pro Lys Glu Ile
    450                 455                 460

Asp Asp Thr Val Thr Ser Asn Asn Asn Tyr Glu Asn Asp Leu Asp Gln
465                 470                 475                 480

Val Ile Leu Asn Phe Asn Ser Glu Ser Ala Pro Gly Leu Ser Asp Glu
                485                 490                 495

Lys Leu Asn Leu Thr Ile Gln Asn Asp Ala Tyr Ile Pro Lys Tyr Asp
            500                 505                 510

Ser Asn Gly Thr Ser Asp Ile Glu Gln His Asp Val Asn Glu Leu Asn
        515                 520                 525

Val Phe Phe Tyr Leu Asp Ala Gln Lys Val Pro Glu Gly Glu Asn Asn
    530                 535                 540

Val Asn Leu Thr Ser Ser Ile Asp Thr Ala Leu Leu Glu Gln Pro Lys
545                 550                 555                 560

Ile Tyr Thr Phe Phe Ser Ser Glu Phe Ile Asn Asn Val Asn Lys Pro
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                565                 570                 575

Val Gln Ala Ala Leu Phe Val Ser Trp Ile Gln Gln Val Leu Val Asp
            580                 585                 590

Phe Thr Thr Glu Ala Asn Gln Lys Ser Thr Val Asp Lys Ile Ala Asp
        595                 600                 605

Ile Ser Ile Val Val Pro Tyr Ile Gly Leu Ala Leu Asn Ile Gly Asn
    610                 615                 620

Glu Ala Gln Lys Gly Asn Phe Lys Asp Ala Leu Glu Leu Leu Gly Ala
625                 630                 635                 640

Gly Ile Leu Leu Glu Phe Glu Pro Glu Leu Leu Ile Pro Thr Ile Leu
                645                 650                 655

Val Phe Thr Ile Lys Ser Phe Leu Gly Ser Ser Asp Asn Lys Asn Lys
            660                 665                 670

Val Ile Lys Ala Ile Asn Asn Ala Leu Lys Glu Arg Asp Glu Lys Trp
        675                 680                 685

Lys Glu Val Tyr Ser Phe Ile Val Ser Asn Trp Met Thr Lys Ile Asn
    690                 695                 700

Thr Gln Phe Asn Lys Arg Lys Glu Gln Met Tyr Gln Ala Leu Gln Asn
705                 710                 715                 720

Gln Val Asn Ala Ile Lys Thr Ile Ile Glu Ser Lys Tyr Asn Ser Tyr
                725                 730                 735

Thr Leu Glu Glu Lys Asn Glu Leu Thr Asn Lys Tyr Asp Ile Lys Gln
            740                 745                 750

Ile Glu Asn Glu Leu Asn Gln Lys Val Ser Ile Ala Met Asn Asn Ile
        755                 760                 765

Asp Arg Phe Leu Thr Glu Ser Ser Ile Ser Tyr Leu Met Lys Leu Ile
    770                 775                 780

Asn Glu Val Lys Ile Asn Lys Leu Arg Glu Tyr Asp Glu Asn Val Lys
785                 790                 795                 800

Thr Tyr Leu Leu Asn Tyr Ile Ile Gln His Gly Ser Ile Leu Gly Glu
                805                 810                 815
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Ser Gln Gln Glu Leu Asn Ser Met Val Thr Asp Thr Leu Asn Asn Ser
            820                 825                 830

Ile Pro Phe Lys Leu Ser Ser Tyr Thr Asp Asp Lys Ile Leu Ile Ser
        835                 840                 845

Tyr Phe Asn Lys Phe Phe Lys Arg Ile Lys Ser Ser Ser Val Leu Asn
    850                 855                 860

Met Arg Tyr Lys Asn Asp Lys Tyr Val Asp Thr Ser Gly Tyr Asp Ser
865                 870                 875                 880

Asn Ile Asn Ile Asn Gly Asp Val Tyr Lys Tyr Pro Thr Asn Lys Asn
                885                 890                 895

Gln Phe Gly Ile Tyr Asn Asp Lys Leu Ser Glu Val Asn Ile Ser Gln
            900                 905                 910

Asn Asp Tyr Ile Ile Tyr Asp Asn Lys Tyr Lys Asn Phe Ser Ile Ser
        915                 920                 925

Phe Trp Val Arg Ile Pro Asn Tyr Asp Asn Lys Ile Val Asn Val Asn
    930                 935                 940

Asn Glu Tyr Thr Ile Ile Asn Cys Met Arg Asp Asn Asn Ser Gly Trp
945                 950                 955                 960

Lys Val Ser Leu Asn His Asn Glu Ile Ile Trp Thr Leu Gln Asp Asn
                965                 970                 975

Ala Gly Ile Asn Gln Lys Leu Ala Phe Asn Tyr Gly Asn Ala Asn Gly
            980                 985                 990

Ile Ser Asp Tyr Ile Asn Lys Trp  Ile Phe Val Thr Ile  Thr Asn Asp
        995                 1000                1005

Arg Leu  Gly Asp Ser Lys Leu  Tyr Ile Asn Gly Asn  Leu Ile Asp
    1010                1015                1020

Gln Lys  Ser Ile Leu Asn Leu  Gly Asn Ile His Val  Ser Asp Asn
    1025                1030                1035

Ile Leu  Phe Lys Ile Val Asn  Cys Ser Tyr Thr Arg  Tyr Ile Gly
    1040                1045                1050

Ile Arg  Tyr Phe Asn Ile Phe  Asp Lys Glu Leu Asp  Glu Thr Glu
    1055                1060                1065
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Ile Gln  Thr Leu Tyr Ser Asn  Glu Pro Asn Thr Asn  Ile Leu Lys
    1070                1075                1080

Asp Phe  Trp Gly Asn Tyr Leu  Leu Tyr Asp Lys Glu  Tyr Tyr Leu
    1085                1090                1095

Leu Asn  Val Leu Lys Pro Asn  Asn Phe Ile Asp Arg  Arg Lys Asp
    1100                1105                1110

Ser Thr  Leu Ser Ile Asn Asn  Ile Arg Ser Thr Ile  Leu Leu Ala
    1115                1120                1125

Asn Arg  Leu Tyr Ser Gly Ile  Lys Val Lys Ile Gln  Arg Val Asn
    1130                1135                1140

Asn Ser  Ser Thr Asn Asp Asn  Leu Val Arg Lys Asn  Asp Gln Val
    1145                1150                1155

Tyr Ile  Asn Phe Val Ala Ser  Lys Thr His Leu Phe  Pro Leu Tyr
    1160                1165                1170

Ala Asp  Thr Ala Thr Thr Asn  Lys Glu Lys Thr Ile  Lys Ile Ser
    1175                1180                1185

Ser Ser  Gly Asn Arg Phe Asn  Gln Val Val Val Met  Asn Ser Val
    1190                1195                1200

Gly Asn  Asn Cys Thr Met Asn  Phe Lys Asn Asn Asn  Gly Asn Asn
    1205                1210                1215

Ile Gly  Leu Leu Gly Phe Lys  Ala Asp Thr Val Val  Ala Ser Thr
    1220                1225                1230

Trp Tyr  Tyr Thr His Met Arg  Asp His Thr Asn Ser  Asn Gly Cys
    1235                1240                1245

Phe Trp  Asn Phe Ile Ser Glu  Glu His Gly Trp Gln  Glu Lys
    1250                1255                1260
```