

105703P502PC.ST25.txt
SEQUENCE LISTING

<110> Merz Pharma GmbH & Co. KGaA
<120> NOVEL METHOD FOR THE MANUFACTURING OF NEUROTOXINS
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<150> EP 09001621.3
<151> 2009-02-05
<150> US 61/206,875
<151> 2009-02-05
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<170> PatentIn version 3.3
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Thr Phe Thr Asn Pro Glu Glu Gly Asp Leu Asn Pro Pro Pro Glu Ala
50 55 60
Lys Gln Val Pro Val Ser Tyr Tyr Asp Ser Thr Tyr Leu Ser Thr Asp
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Asn Glu Lys Asp Asn Tyr Leu Lys Gly Val Thr Lys Leu Phe Glu Arg
85 90 95
Ile Tyr Ser Thr Asp Leu Gly Arg Met Leu Leu Thr Ser Ile Val Arg
100 105 110
Gly Ile Pro Phe Trp Gly Gly Ser Thr Ile Asp Thr Glu Leu Lys Val
115 120 125
Ile Asp Thr Asn Cys Ile Asn Val Ile Gln Pro Asp Gly Ser Tyr Arg
130 135 140
Ser Glu Glu Leu Asn Leu Val Ile Ile Gly Pro Ser Ala Asp Ile Ile
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Gln Phe Glu Cys Lys Ser Phe Gly His Glu Val Leu Asn Leu Thr Arg
165 170 175

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Asn Gly Tyr Gly Ser Thr Gln Tyr Ile Arg Phe Ser Pro Asp Phe Thr
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 Phe Gly Phe Glu Glu Ser Leu Glu Val Asp Thr Asn Pro Leu Leu Gly
 195 200 205
 Ala Gly Lys Phe Ala Thr Asp Pro Ala Val Thr Leu Ala His Glu Leu
 210 215 220
 Ile His Ala Gly His Arg Leu Tyr Gly Ile Ala Ile Asn Pro Asn Arg
 225 230 235 240
 Val Phe Lys Val Asn Thr Asn Ala Tyr Tyr Glu Met Ser Gly Leu Glu
 245 250 255
 Val Ser Phe Glu Glu Leu Arg Thr Phe Gly Gly His Asp Ala Lys Phe
 260 265 270
 Ile Asp Ser Leu Gln Glu Asn Glu Phe Arg Leu Tyr Tyr Tyr Asn Lys
 275 280 285
 Phe Lys Asp Ile Ala Ser Thr Leu Asn Lys Ala Lys Ser Ile Val Gly
 290 295 300
 Thr Thr Ala Ser Leu Gln Tyr Met Lys Asn Val Phe Lys Glu Lys Tyr
 305 310 315 320
 Leu Leu Ser Glu Asp Thr Ser Gly Lys Phe Ser Val Asp Lys Leu Lys
 325 330 335
 Phe Asp Lys Leu Tyr Lys Met Leu Thr Glu Ile Tyr Thr Glu Asp Asn
 340 345 350
 Phe Val Lys Phe Phe Lys Val Leu Asn Arg Lys Thr Tyr Leu Asn Phe
 355 360 365
 Asp Lys Ala Val Phe Lys Ile Asn Ile Val Pro Lys Val Asn Tyr Thr
 370 375 380
 Ile Tyr Asp Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe
 385 390 395 400
 Asn Gly Gln Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys
 405 410 415
 Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly
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 Ile Ile Thr Ser Lys Pro Val Lys Gln Leu Leu Asn Phe Asp Leu Leu
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Glu Ile Thr Ser Asp Thr Asn Ile Glu Ala Ala Glu Glu Asn Ile Ser
35 40 45

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

Glu Leu Asp Lys Tyr Thr Met Phe His Tyr Leu Arg Ala Gln Glu Phe
100 105 110

Glu His Gly Lys Ser Arg Ile Ala Leu Thr Asn Ser Val Asn Glu Ala
115 120 125

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130 135 140

Lys Lys Val Asn Lys Ala Thr Glu Ala Ala Met Phe Leu Gly Trp Val
145 150 155 160

Glu Gln Leu Val Tyr Asp Phe Thr Asp Glu Thr Ser Glu Val Ser Thr
165 170 175

Thr Asp Lys Ile Ala Asp Ile Thr Ile Ile Ile Pro Tyr Ile Gly Pro
180 185 190

Ala Leu Asn Ile Gly Asn Met Leu Tyr Lys Asp Asp Phe Val Gly Ala
195 200 205

Leu Ile Phe Ser Gly Ala Val Ile Leu Leu Glu Phe Ile Pro Glu Ile
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Ala Ile Pro Val Leu Gly Thr Phe Ala Leu Val Ser Tyr Ile Ala Asn
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Lys Val Leu Thr Val Gln Thr Ile Asp Asn Ala Leu Ser Lys Arg Asn
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Glu Lys Trp Asp Glu Val Tyr Lys Tyr Ile Val Thr Asn Trp Leu Ala
260 265 270

Lys Val Asn Thr Gln Ile Asp Leu Ile Arg Lys Lys Met Lys Glu Ala
275 280 285

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

Asn Gln Tyr Thr Glu Glu Glu Lys Asn Asn Ile Asn Phe Asn Ile Asp
305 310 315 320

Asp Leu Ser Ser Lys Leu Asn Glu Ser Ile Asn Lys Ala Met Ile Asn
325 330 335

Ile Asn Lys Phe Leu Asn Gln Cys Ser Val Ser Tyr Leu Met Asn Ser
340 345 350

Met Ile Pro Tyr Gly Val Lys Arg Leu Glu Asp Phe Asp Ala Ser Leu
355 360 365

Lys Asp Ala Leu Leu Lys Tyr Ile Tyr Asp Asn Arg Gly Thr Leu Ile
370 375 380

Gly Gln Val Asp Arg Leu Lys Asp Lys Val Asn Asn Thr Leu Ser Thr
385 390 395 400

Asp Ile Pro Phe Gln Leu Ser Lys Tyr Val Asp Asn Gln Arg Leu Leu
405 410 415

Ser Thr Phe Thr Glu Tyr Ile Lys Asn Ile Ile Asn Thr Ser Ile Leu
420 425 430

Asn Leu Arg Tyr Glu Ser Asn His Leu Ile Asp Leu Ser Arg Tyr Ala
435 440 445

Ser Lys Ile Asn Ile Gly Ser Lys Val Asn Phe Asp Pro Ile Asp Lys
450 455 460

Asn Gln Ile Gln Leu Phe Asn Leu Glu Ser Ser Lys Ile Glu Val Ile
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Leu Lys Asn Ala Ile Val Tyr Asn Ser Met Tyr Glu Asn Phe Ser Thr
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Ser Phe Trp Ile Arg Ile Pro Lys Tyr Phe Asn Ser Ile Ser Leu Asn
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 Val Ser Leu Asn Tyr Gly Glu Ile Ile Trp Thr Leu Gln Asp Thr Gln
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 Glu Ile Lys Gln Arg Val Val Phe Lys Tyr Ser Gln Met Ile Asn Ile
 545 550 555 560
 Ser Asp Tyr Ile Asn Arg Trp Ile Phe Val Thr Ile Thr Asn Asn Arg
 565 570 575
 Leu Asn Asn Ser Lys Ile Tyr Ile Asn Gly Arg Leu Ile Asp Gln Lys
 580 585 590
 Pro Ile Ser Asn Leu Gly Asn Ile His Ala Ser Asn Asn Ile Met Phe
 595 600 605
 Lys Leu Asp Gly Cys Arg Asp Thr His Arg Tyr Ile Trp Ile Lys Tyr
 610 615 620
 Phe Asn Leu Phe Asp Lys Glu Leu Asn Glu Lys Glu Ile Lys Asp Leu
 625 630 635 640
 Tyr Asp Asn Gln Ser Asn Ser Gly Ile Leu Lys Asp Phe Trp Gly Asp
 645 650 655
 Tyr Leu Gln Tyr Asp Lys Pro Tyr Tyr Met Leu Asn Leu Tyr Asp Pro
 660 665 670
 Asn Lys Tyr Val Asp Val Asn Asn Val Gly Ile Arg Gly Tyr Met Tyr
 675 680 685
 Leu Lys Gly Pro Arg Gly Ser Val Met Thr Thr Asn Ile Tyr Leu Asn
 690 695 700
 Ser Ser Leu Tyr Arg Gly Thr Lys Phe Ile Ile Lys Lys Tyr Ala Ser
 705 710 715 720
 Gly Asn Lys Asp Asn Ile Val Arg Asn Asn Asp Arg Val Tyr Ile Asn
 725 730 735
 Val Val Val Lys Asn Lys Glu Tyr Arg Leu Ala Thr Asn Ala Ser Gln
 740 745 750
 Ala Gly Val Glu Lys Ile Leu Ser Ala Leu Glu Ile Pro Asp Val Gly
 755 760 765

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Asn Leu Ser Gln Val Val Val Met Lys Ser Lys Asn Asp Gln Gly Ile
770 775 780

Thr Asn Lys Cys Lys Met Asn Leu Gln Asp Asn Asn Gly Asn Asp Ile
785 790 795 800

Gly Phe Ile Gly Phe His Gln Phe Asn Asn Ile Ala Lys Leu Val Ala
805 810 815

Ser Asn Trp Tyr Asn Arg Gln Ile Glu Arg Ser Ser Arg Thr Leu Gly
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Cys Ser Trp Glu Phe Ile Pro Val Asp Asp Gly Trp Gly Glu Arg Pro
835 840 845

Leu

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<213> CLOSTRIDIUM TETANI

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

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

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

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

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

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

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

Gly Ala Thr Thr Lys Ser Ala Met Leu Thr Asn Leu Ile Ile Phe Gly

145 150 155 160
 Pro Gly Pro Val Leu Asn Lys Asn Glu Val Arg Gly Ile Val Leu Arg
 165 170 175
 Val Asp Asn Lys Asn Tyr Phe Pro Cys Arg Asp Gly Phe Gly Ser Ile
 180 185 190
 Met Gln Met Ala Phe Cys Pro Glu Tyr Val Pro Thr Phe Asp Asn Val
 195 200 205
 Ile Glu Asn Ile Thr Ser Leu Thr Ile Gly Lys Ser Lys Tyr Phe Gln
 210 215 220
 Asp Pro Ala Leu Leu Leu Met His Glu Leu Ile His Val Leu His Gly
 225 230 235 240
 Leu Tyr Gly Met Gln Val Ser Ser His Glu Ile Ile Pro Ser Lys Gln
 245 250 255
 Glu Ile Tyr Met Gln His Thr Tyr Pro Ile Ser Ala Glu Glu Leu Phe
 260 265 270
 Thr Phe Gly Gly Gln Asp Ala Asn Leu Ile Ser Ile Asp Ile Lys Asn
 275 280 285
 Asp Leu Tyr Glu Lys Thr Leu Asn Asp Tyr Lys Ala Ile Ala Asn Lys
 290 295 300
 Leu Ser Gln Val Thr Ser Cys Asn Asp Pro Asn Ile Asp Ile Asp Ser
 305 310 315 320
 Tyr Lys Gln Ile Tyr Gln Gln Lys Tyr Gln Phe Asp Lys Asp Ser Asn
 325 330 335
 Gly Gln Tyr Ile Val Asn Glu Asp Lys Phe Gln Ile Leu Tyr Asn Ser
 340 345 350
 Ile Met Tyr Gly Phe Thr Glu Ile Glu Leu Gly Lys Lys Phe Asn Ile
 355 360 365
 Lys Thr Arg Leu Ser Tyr Phe Ser Met Asn His Asp Pro Val Lys Ile
 370 375 380
 Pro Asn Leu Leu Asp Asp Thr Ile Tyr Asn Asp Thr Glu Gly Phe Asn
 385 390 395 400
 Ile Glu Ser Lys Asp Leu Lys Ser Glu Tyr Lys Gly Gln Asn Met Arg
 405 410 415
 Val Asn Thr Asn Ala Phe Arg Asn Val Asp Gly Ser Gly Leu Val Ser
 420 425 430 435 440

420

425

430

Lys Leu Ile Gly Leu Cys Lys Lys Ile Ile Pro Pro Pro Val Lys Gln
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Pro Gly
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 <400> 4

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 20 25 30

Glu Ile Val Ser Tyr Asn Thr Lys Asn Lys Pro Leu Asn Phe Asn Tyr
 35 40 45

Ser Leu Asp Lys Ile Ile Val Asp Tyr Asn Leu Gln Ser Lys Ile Thr
 50 55 60

Leu Pro Asn Asp Arg Thr Thr Pro Val Thr Lys Gly Ile Pro Tyr Ala
 65 70 75 80

Pro Glu Tyr Lys Ser Asn Ala Ala Ser Thr Ile Glu Ile His Asn Ile
 85 90 95

Asp Asp Asn Thr Ile Tyr Gln Tyr Leu Tyr Ala Gln Lys Ser Pro Thr
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Thr Leu Gln Arg Ile Thr Met Thr Asn Ser Val Asp Asp Ala Leu Ile
 115 120 125

Asn Ser Thr Lys Ile Tyr Ser Tyr Phe Pro Ser Val Ile Ser Lys Val
 130 135 140

Asn Gln Gly Ala Gln Gly Ile Leu Phe Leu Gln Trp Val Arg Asp Ile
 145 150 155 160

Ile Asp Asp Phe Thr Asn Glu Ser Ser Gln Lys Thr Thr Ile Asp Lys
 165 170 175

Ile Ser Asp Val Ser Thr Ile Val Pro Tyr Ile Gly Pro Ala Leu Asn
 180 185 190

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Ile Val Lys Gln Gly Tyr Glu Gly Asn Phe Ile Gly Ala Leu Glu Thr
195 200 205

Thr Gly Val Val Leu Leu Leu Glu Tyr Ile Pro Glu Ile Thr Leu Pro
210 215 220

Val Ile Ala Ala Leu Ser Ile Ala Glu Ser Ser Thr Gln Lys Glu Lys
225 230 235 240

Ile Ile Lys Thr Ile Asp Asn Phe Leu Glu Lys Arg Tyr Glu Lys Trp
245 250 255

Ile Glu Val Tyr Lys Leu Val Lys Ala Lys Trp Leu Gly Thr Val Asn
260 265 270

Thr Gln Phe Gln Lys Arg Ser Tyr Gln Met Tyr Arg Ser Leu Glu Tyr
275 280 285

Gln Val Asp Ala Ile Lys Lys Ile Ile Asp Tyr Glu Tyr Lys Ile Tyr
290 295 300

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

Asn Lys Leu Glu Glu Lys Ala Asn Lys Ala Met Ile Asn Ile Asn Ile
325 330 335

Phe Met Arg Glu Ser Ser Arg Ser Phe Leu Val Asn Gln Met Ile Asn
340 345 350

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

Leu Met Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile Thr Glu
370 375 380

Leu Lys Lys Leu Glu Ser Lys Ile Asn Lys Val Phe Ser Thr Pro Ile
385 390 395 400

Pro Phe Ser Tyr Ser Lys Asn Leu Asp Cys Trp Val Asp Asn Glu Glu
405 410 415

Asp Ile Asp Val Ile Leu Lys Lys Ser Thr Ile Leu Asn Leu Asp Ile
420 425 430

Asn Asn Asp Ile Ile Ser Asp Ile Ser Gly Phe Asn Ser Ser Val Ile
435 440 445

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

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His Leu Val Asn Asn Glu Ser Ser Glu Val Ile Val His Lys Ala Met
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 Asp Ile Glu Tyr Asn Asp Met Phe Asn Asn Phe Thr Val Ser Phe Trp
 485 490 495
 Leu Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Gln Tyr Gly Thr
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 Asn Glu Tyr Ser Ile Ile Ser Ser Met Lys Lys His Ser Leu Ser Ile
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 Gly Ser Gly Trp Ser Val Ser Leu Lys Gly Asn Asn Leu Ile Trp Thr
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 Leu Lys Asp Ser Ala Gly Glu Val Arg Gln Ile Thr Phe Arg Asp Leu
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 Pro Asp Lys Phe Asn Ala Tyr Leu Ala Asn Lys Trp Val Phe Ile Thr
 565 570 575
 Ile Thr Asn Asp Arg Leu Ser Ser Ala Asn Leu Tyr Ile Asn Gly Val
 580 585 590
 Leu Met Gly Ser Ala Glu Ile Thr Gly Leu Gly Ala Ile Arg Glu Asp
 595 600 605
 Asn Asn Ile Thr Leu Lys Leu Asp Arg Cys Asn Asn Asn Asn Gln Tyr
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 Val Ser Ile Asp Lys Phe Arg Ile Phe Cys Lys Ala Leu Asn Pro Lys
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 Glu Ile Glu Lys Leu Tyr Thr Ser Tyr Leu Ser Ile Thr Phe Leu Arg
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 Asp Phe Trp Gly Asn Pro Leu Arg Tyr Asp Thr Glu Tyr Tyr Leu Ile
 660 665 670
 Pro Val Ala Ser Ser Ser Lys Asp Val Gln Leu Lys Asn Ile Thr Asp
 675 680 685
 Tyr Met Tyr Leu Thr Asn Ala Pro Ser Tyr Thr Asn Gly Lys Leu Asn
 690 695 700
 Ile Tyr Tyr Arg Arg Leu Tyr Asn Gly Leu Lys Phe Ile Ile Lys Arg
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 Tyr Thr Pro Asn Asn Glu Ile Asp Ser Phe Val Lys Ser Gly Asp Phe
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Ile Lys Leu Tyr Val Ser Tyr Asn Asn Asn Glu His Ile Val Gly Tyr
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Pro Lys Asp Gly Asn Ala Phe Asn Asn Leu Asp Arg Ile Leu Arg Val
755 760 765

Gly Tyr Asn Ala Pro Gly Ile Pro Leu Tyr Lys Lys Met Glu Ala Val
770 775 780

Lys Leu Arg Asp Leu Lys Thr Tyr Ser Val Gln Leu Lys Leu Tyr Asp
785 790 795 800

Asp Lys Asn Ala Ser Leu Gly Leu Val Gly Thr His Asn Gly Gln Ile
805 810 815

Gly Asn Asp Pro Asn Arg Asp Ile Leu Ile Ala Ser Asn Trp Tyr Phe
820 825 830

Asn His Leu Lys Asp Lys Ile Leu Gly Cys Asp Trp Tyr Phe Val Pro
835 840 845

Thr Asp Glu Gly Trp Thr Asn Asp
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| aaatctatcg | tgggcacaac | cgccagcttg | caatacatga | aaaatgtgtt | caaagagaag | 960 |
| tacctgttgt | cagaagatac | gagtggcaag | tttagtgtag | acaagcttaa | gttcgacaaa | 1020 |
| ctttataaga | tgctgactga | gatttacacc | gaagacaatt | tcgtcaaatt | tttcaaagtt | 1080 |
| ctcaaccgga | agacctattt | gaattttgac | aaagccgtct | ttaaaataaa | cattgttcct | 1140 |
| aaagtcaact | ataccattta | tgacggattt | aatttgagaa | acaccaactt | ggctgcaaac | 1200 |
| tttaacgggc | aaaatacaga | gattaataac | atgaatttca | cgaagttgaa | gaacttcaca | 1260 |
| ggtttgttcg | agttctacaa | actactgtgt | gtacggggca | ttataacgtc | caagcctgtg | 1320 |
| aaacagttgc | taaactttga | tttgctgaag | ttggctggag | atgtcgaatc | taaccctgga | 1380 |
| cctgctttga | acgattttgt | cattaaggta | aataactggg | acttattttt | ctctccctct | 1440 |
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| gaacagttgg | tttatgactt | tactgacgaa | acctccgagg | tttccactac | cgataaaata | 1920 |
| gcagatatca | ctataattat | accctacatt | ggacctgctc | tcaatatcgg | aaacatgtta | 1980 |
| tataaggatg | actttgtttg | tgctctaatt | ttctccggcg | ccgtaattct | actggagttt | 2040 |
| attcccgaag | tagctatacc | tgtcttgagg | acatttgctc | tggtttcgta | cattgctaata | 2100 |
| aagggttttg | ctgtccaaac | aattgataac | gcactgtcaa | agcgaaacga | gaaatgggac | 2160 |
| gaggtatata | agtatatagt | aacgaactgg | ctcgcaaagg | tgaatactca | aattgatctc | 2220 |
| attagaaaga | aaatgaaaga | agcattggaa | aaccaagccg | aggctacaaa | agcgattata | 2280 |
| aattaccagt | acaaccagta | tactgaagag | gaaaagaaca | atattaattt | taatatcgat | 2340 |
| gacttgagta | gcaagctcaa | tgaatccata | aataaggcta | tgattaacat | aaacaaattc | 2400 |
| ttgaaccagt | gtagcgttag | ttatttgatg | aactctatga | taccatatgg | ggttaagaga | 2460 |
| ctggaagatt | ttgatgcctc | gctgaaggat | gcccttttga | agtatattta | cgacaatcga | 2520 |
| ggtagcctga | tcggacaagt | cgacagacta | aaggacaagg | tcaacaatac | tttgtctacc | 2580 |
| gacatcccat | ttcaactttc | taaatatgtt | gataacccaa | gattgctttc | tactttcacc | 2640 |
| gaatacatta | aaaatataat | taataccagt | atthttgaatc | tgagatatga | gtctaaccac | 2700 |
| ttaatagatt | taagtcgtta | tgcttcgaag | attaacattg | ggctctaaagt | gaactttgat | 2760 |
| ccgatcgaca | agaaccagat | ccagttgttt | aatctcgaat | cctcaaagat | tgaggtcatt | 2820 |
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 35 40 45

Thr Phe Thr Asn Pro Glu Glu Gly Asp Leu Asn Pro Pro Pro Glu Ala
 50 55 60

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

Asn Glu Lys Asp Asn Tyr Leu Lys Gly Val Thr Lys Leu Phe Glu Arg
 85 90 95

Ile Tyr Ser Thr Asp Leu Gly Arg Met Leu Leu Thr Ser Ile Val Arg
 100 105 110

Gly Ile Pro Phe Trp Gly Gly Ser Thr Ile Asp Thr Glu Leu Lys Val
 115 120 125

Ile Asp Thr Asn Cys Ile Asn Val Ile Gln Pro Asp Gly Ser Tyr Arg
 130 135 140

Ser Glu Glu Leu Asn Leu Val Ile Ile Gly Pro Ser Ala Asp Ile Ile
 145 150 155 160

Gln Phe Glu Cys Lys Ser Phe Gly His Glu Val Leu Asn Leu Thr Arg
 165 170 175

Asn Gly Tyr Gly Ser Thr Gln Tyr Ile Arg Phe Ser Pro Asp Phe Thr
 180 185 190

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

Ala Gly Lys Phe Ala Thr Asp Pro Ala Val Thr Leu Ala His Glu Leu
 210 215 220

Ile His Ala Gly His Arg Leu Tyr Gly Ile Ala Ile Asn Pro Asn Arg
 225 230 235 240

Val Phe Lys Val Asn Thr Asn Ala Tyr Tyr Glu Met Ser Gly Leu Glu
 245 250 255

Val Ser Phe Glu Glu Leu Arg Thr Phe Gly Gly His Asp Ala Lys Phe
 260 265 270

Ile Asp Ser Leu Gln Glu Asn Glu Phe Arg Leu Tyr Tyr Tyr Asn Lys
 275 280 285

Phe Lys Asp Ile Ala Ser Thr Leu Asn Lys Ala Lys Ser Ile Val Gly
 290 295 300

Thr Thr Ala Ser Leu Gln Tyr Met Lys Asn Val Phe Lys Glu Lys Tyr
 305 310 315 320

Leu Leu Ser Glu Asp Thr Ser Gly Lys Phe Ser Val Asp Lys Leu Lys
 325 330 335

Phe Asp Lys Leu Tyr Lys Met Leu Thr Glu Ile Tyr Thr Glu Asp Asn
 340 345 350

Phe Val Lys Phe Phe Lys Val Leu Asn Arg Lys Thr Tyr Leu Asn Phe
 355 360 365

Asp Lys Ala Val Phe Lys Ile Asn Ile Val Pro Lys Val Asn Tyr Thr
 370 375 380
 Ile Tyr Asp Gly Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe
 385 390 395 400
 Asn Gly Gln Asn Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys
 405 410 415
 Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly
 420 425 430
 Ile Ile Thr Ser Lys Pro Val Lys Gln Leu Leu Asn Phe Asp Leu Leu
 435 440 445
 Lys Leu Ala Gly Asp Val Glu Ser Asn Pro Gly Pro Ala Leu Asn Asp
 450 455 460
 Leu Cys Ile Lys Val Asn Asn Trp Asp Leu Phe Phe Ser Pro Ser Glu
 465 470 475 480
 Asp Asn Phe Thr Asn Asp Leu Asn Lys Gly Glu Glu Ile Thr Ser Asp
 485 490 495
 Thr Asn Ile Glu Ala Ala Glu Glu Asn Ile Ser Leu Asp Leu Ile Gln
 500 505 510
 Gln Tyr Tyr Leu Thr Phe Asn Phe Asp Asn Glu Pro Glu Asn Ile Ser
 515 520 525
 Ile Glu Asn Leu Ser Ser Asp Ile Ile Gly Gln Leu Glu Leu Met Pro
 530 535 540
 Asn Ile Glu Arg Phe Pro Asn Gly Lys Lys Tyr Glu Leu Asp Lys Tyr
 545 550 555 560
 Thr Met Phe His Tyr Leu Arg Ala Gln Glu Phe Glu His Gly Lys Ser
 565 570 575
 Arg Ile Ala Leu Thr Asn Ser Val Asn Glu Ala Leu Leu Asn Pro Ser
 580 585 590
 Arg Val Tyr Thr Phe Phe Ser Ser Asp Tyr Val Lys Lys Val Asn Lys
 595 600 605
 Ala Thr Glu Ala Ala Met Phe Leu Gly Trp Val Glu Gln Leu Val Tyr
 610 615 620
 Asp Phe Thr Asp Glu Thr Ser Glu Val Ser Thr Thr Asp Lys Ile Ala
 625 630 635 640

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Asp Ile Thr Ile Ile Ile Pro Tyr Ile Gly Pro Ala Leu Asn Ile Gly
645 650 655

Asn Met Leu Tyr Lys Asp Asp Phe Val Gly Ala Leu Ile Phe Ser Gly
660 665 670

Ala Val Ile Leu Leu Glu Phe Ile Pro Glu Ile Ala Ile Pro Val Leu
675 680 685

Gly Thr Phe Ala Leu Val Ser Tyr Ile Ala Asn Lys Val Leu Thr Val
690 695 700

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

Val Tyr Lys Tyr Ile Val Thr Asn Trp Leu Ala Lys Val Asn Thr Gln
725 730 735

Ile Asp Leu Ile Arg Lys Lys Met Lys Glu Ala Leu Glu Asn Gln Ala
740 745 750

Glu Ala Thr Lys Ala Ile Ile Asn Tyr Gln Tyr Asn Gln Tyr Thr Glu
755 760 765

Glu Glu Lys Asn Asn Ile Asn Phe Asn Ile Asp Asp Leu Ser Ser Lys
770 775 780

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

Asn Gln Cys Ser Val Ser Tyr Leu Met Asn Ser Met Ile Pro Tyr Gly
805 810 815

Val Lys Arg Leu Glu Asp Phe Asp Ala Ser Leu Lys Asp Ala Leu Leu
820 825 830

Lys Tyr Ile Tyr Asp Asn Arg Gly Thr Leu Ile Gly Gln Val Asp Arg
835 840 845

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

Leu Ser Lys Tyr Val Asp Asn Gln Arg Leu Leu Ser Thr Phe Thr Glu
865 870 875 880

Tyr Ile Lys Asn Ile Ile Asn Thr Ser Ile Leu Asn Leu Arg Tyr Glu
885 890 895

Ser Asn His Leu Ile Asp Leu Ser Arg Tyr Ala Ser Lys Ile Asn Ile
900 905 910

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Gly Ser Lys Val Asn Phe Asp Pro Ile Asp Lys Asn Gln Ile Gln Leu
 915 920 925

Phe Asn Leu Glu Ser Ser Lys Ile Glu Val Ile Leu Lys Asn Ala Ile
 930 935 940

Val Tyr Asn Ser Met Tyr Glu Asn Phe Ser Thr Ser Phe Trp Ile Arg
 945 950 955 960

Ile Pro Lys Tyr Phe Asn Ser Ile Ser Leu Asn Asn Glu Tyr Thr Ile
 965 970 975

Ile Asn Cys Met Glu Asn Asn Ser Gly Trp Lys Val Ser Leu Asn Tyr
 980 985 990

Gly Glu Ile Ile Trp Thr Leu Gln Asp Thr Gln Glu Ile Lys Gln Arg
 995 1000 1005

Val Val Phe Lys Tyr Ser Gln Met Ile Asn Ile Ser Asp Tyr Ile
 1010 1015 1020

Asn Arg Trp Ile Phe Val Thr Ile Thr Asn Asn Arg Leu Asn Asn
 1025 1030 1035

Ser Lys Ile Tyr Ile Asn Gly Arg Leu Ile Asp Gln Lys Pro Ile
 1040 1045 1050

Ser Asn Leu Gly Asn Ile His Ala Ser Asn Asn Ile Met Phe Lys
 1055 1060 1065

Leu Asp Gly Cys Arg Asp Thr His Arg Tyr Ile Trp Ile Lys Tyr
 1070 1075 1080

Phe Asn Leu Phe Asp Lys Glu Leu Asn Glu Lys Glu Ile Lys Asp
 1085 1090 1095

Leu Tyr Asp Asn Gln Ser Asn Ser Gly Ile Leu Lys Asp Phe Trp
 1100 1105 1110

Gly Asp Tyr Leu Gln Tyr Asp Lys Pro Tyr Tyr Met Leu Asn Leu
 1115 1120 1125

Tyr Asp Pro Asn Lys Tyr Val Asp Val Asn Asn Val Gly Ile Arg
 1130 1135 1140

Gly Tyr Met Tyr Leu Lys Gly Pro Arg Gly Ser Val Met Thr Thr
 1145 1150 1155

Asn Ile Tyr Leu Asn Ser Ser Leu Tyr Arg Gly Thr Lys Phe Ile
 1160 1165 1170

Ile Lys Lys Tyr Ala Ser Gly Asn Lys Asp Asn Ile Val Arg Asn
 1175 1180 1185

Asn Asp Arg Val Tyr Ile Asn Val Val Val Lys Asn Lys Glu Tyr
 1190 1195 1200

Arg Leu Ala Thr Asn Ala Ser Gln Ala Gly Val Glu Lys Ile Leu
 1205 1210 1215

Ser Ala Leu Glu Ile Pro Asp Val Gly Asn Leu Ser Gln Val Val
 1220 1225 1230

Val Met Lys Ser Lys Asn Asp Gln Gly Ile Thr Asn Lys Cys Lys
 1235 1240 1245

Met Asn Leu Gln Asp Asn Asn Gly Asn Asp Ile Gly Phe Ile Gly
 1250 1255 1260

Phe His Gln Phe Asn Asn Ile Ala Lys Leu Val Ala Ser Asn Trp
 1265 1270 1275

Tyr Asn Arg Gln Ile Glu Arg Ser Ser Arg Thr Leu Gly Cys Ser
 1280 1285 1290

Trp Glu Phe Ile Pro Val Asp Asp Gly Trp Gly Glu Arg Pro Leu
 1295 1300 1305

<210> 7

<211> 1303

<212> PRT

<213> Clostridium botulinum

<400> 7

Pro Phe Val Asn Lys Gln Phe Asn Tyr Lys Asp Pro Val Asn Gly Val
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Asp Ile Ala Tyr Ile Lys Ile Pro Asn Ala Gly Gln Met Gln Pro Val
 20 25 30

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

Thr Phe Thr Asn Pro Glu Glu Gly Asp Leu Asn Pro Pro Pro Glu Ala
 50 55 60

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

Asn Glu Lys Asp Asn Tyr Leu Lys Gly Val Thr Lys Leu Phe Glu Arg
 85 90 95

Ile Tyr Ser Thr Asp Leu Gly Arg Met Leu Leu Thr Ser Ile Val Arg
 Seite 18

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

370

375

380

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

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

Asn Phe Thr Gly Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly
 420 425 430

Ile Ile Thr Ser Lys Glu Gly Arg Gly Ser Leu Leu Thr Cys Gly Asp
 435 440 445

Val Glu Glu Asn Pro Gly Pro Ala Leu Asn Asp Leu Cys Ile Lys Val
 450 455 460

Asn Asn Trp Asp Leu Phe Phe Ser Pro Ser Glu Asp Asn Phe Thr Asn
 465 470 475 480

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

Ala Glu Glu Asn Ile Ser Leu Asp Leu Ile Gln Gln Tyr Tyr Leu Thr
 500 505 510

Phe Asn Phe Asp Asn Glu Pro Glu Asn Ile Ser Ile Glu Asn Leu Ser
 515 520 525

Ser Asp Ile Ile Gly Gln Leu Glu Leu Met Pro Asn Ile Glu Arg Phe
 530 535 540

Pro Asn Gly Lys Lys Tyr Glu Leu Asp Lys Tyr Thr Met Phe His Tyr
 545 550 555 560

Leu Arg Ala Gln Glu Phe Glu His Gly Lys Ser Arg Ile Ala Leu Thr
 565 570 575

Asn Ser Val Asn Glu Ala Leu Leu Asn Pro Ser Arg Val Tyr Thr Phe
 580 585 590

Phe Ser Ser Asp Tyr Val Lys Lys Val Asn Lys Ala Thr Glu Ala Ala
 595 600 605

Met Phe Leu Gly Trp Val Glu Gln Leu Val Tyr Asp Phe Thr Asp Glu
 610 615 620

Thr Ser Glu Val Ser Thr Thr Asp Lys Ile Ala Asp Ile Thr Ile Ile
 625 630 635 640

Ile Pro Tyr Ile Gly Pro Ala Leu Asn Ile Gly Asn Met Leu Tyr Lys

645

650

655

Asp Asp Phe Val Gly Ala Leu Ile Phe Ser Gly Ala Val Ile Leu Leu
660 665 670

Glu Phe Ile Pro Glu Ile Ala Ile Pro Val Leu Gly Thr Phe Ala Leu
675 680 685

Val Ser Tyr Ile Ala Asn Lys Val Leu Thr Val Gln Thr Ile Asp Asn
690 695 700

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

Val Thr Asn Trp Leu Ala Lys Val Asn Thr Gln Ile Asp Leu Ile Arg
725 730 735

Lys Lys Met Lys Glu Ala Leu Glu Asn Gln Ala Glu Ala Thr Lys Ala
740 745 750

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

Ile Asn Phe Asn Ile Asp Asp Leu Ser Ser Lys Leu Asn Glu Ser Ile
770 775 780

Asn Lys Ala Met Ile Asn Ile Asn Lys Phe Leu Asn Gln Cys Ser Val
785 790 795 800

Ser Tyr Leu Met Asn Ser Met Ile Pro Tyr Gly Val Lys Arg Leu Glu
805 810 815

Asp Phe Asp Ala Ser Leu Lys Asp Ala Leu Leu Lys Tyr Ile Tyr Asp
820 825 830

Asn Arg Gly Thr Leu Ile Gly Gln Val Asp Arg Leu Lys Asp Lys Val
835 840 845

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

Asp Asn Gln Arg Leu Leu Ser Thr Phe Thr Glu Tyr Ile Lys Asn Ile
865 870 875 880

Ile Asn Thr Ser Ile Leu Asn Leu Arg Tyr Glu Ser Asn His Leu Ile
885 890 895

Asp Leu Ser Arg Tyr Ala Ser Lys Ile Asn Ile Gly Ser Lys Val Asn
900 905 910

Phe Asp Pro Ile Asp Lys Asn Gln Ile Gln Leu Phe Asn Leu Glu Ser

Ser Lys Ile Glu Val Ile Leu Lys Asn Ala Ile Val Tyr Asn Ser Met
930 935 940

Tyr Glu Asn Phe Ser Thr Ser Phe Trp Ile Arg Ile Pro Lys Tyr Phe
945 950 955 960

Asn Ser Ile Ser Leu Asn Asn Glu Tyr Thr Ile Ile Asn Cys Met Glu
965 970 975

Asn Asn Ser Gly Trp Lys Val Ser Leu Asn Tyr Gly Glu Ile Ile Trp
980 985 990

Thr Leu Gln Asp Thr Gln Glu Ile Lys Gln Arg Val Val Phe Lys Tyr
995 1000 1005

Ser Gln Met Ile Asn Ile Ser Asp Tyr Ile Asn Arg Trp Ile Phe
1010 1015 1020

Val Thr Ile Thr Asn Asn Arg Leu Asn Asn Ser Lys Ile Tyr Ile
1025 1030 1035

Asn Gly Arg Leu Ile Asp Gln Lys Pro Ile Ser Asn Leu Gly Asn
1040 1045 1050

Ile His Ala Ser Asn Asn Ile Met Phe Lys Leu Asp Gly Cys Arg
1055 1060 1065

Asp Thr His Arg Tyr Ile Trp Ile Lys Tyr Phe Asn Leu Phe Asp
1070 1075 1080

Lys Glu Leu Asn Glu Lys Glu Ile Lys Asp Leu Tyr Asp Asn Gln
1085 1090 1095

Ser Asn Ser Gly Ile Leu Lys Asp Phe Trp Gly Asp Tyr Leu Gln
1100 1105 1110

Tyr Asp Lys Pro Tyr Tyr Met Leu Asn Leu Tyr Asp Pro Asn Lys
1115 1120 1125

Tyr Val Asp Val Asn Asn Val Gly Ile Arg Gly Tyr Met Tyr Leu
1130 1135 1140

Lys Gly Pro Arg Gly Ser Val Met Thr Thr Asn Ile Tyr Leu Asn
1145 1150 1155

Ser Ser Leu Tyr Arg Gly Thr Lys Phe Ile Ile Lys Lys Tyr Ala
1160 1165 1170

Ser Gly Asn Lys Asp Asn Ile Val Arg Asn Asn Asp Arg Val Tyr

1175

1180

1185

Ile Asn Val Val Val Lys Asn Lys Glu Tyr Arg Leu Ala Thr Asn
 1190 1195 1200

Ala Ser Gln Ala Gly Val Glu Lys Ile Leu Ser Ala Leu Glu Ile
 1205 1210 1215

Pro Asp Val Gly Asn Leu Ser Gln Val Val Val Met Lys Ser Lys
 1220 1225 1230

Asn Asp Gln Gly Ile Thr Asn Lys Cys Lys Met Asn Leu Gln Asp
 1235 1240 1245

Asn Asn Gly Asn Asp Ile Gly Phe Ile Gly Phe His Gln Phe Asn
 1250 1255 1260

Asn Ile Ala Lys Leu Val Ala Ser Asn Trp Tyr Asn Arg Gln Ile
 1265 1270 1275

Glu Arg Ser Ser Arg Thr Leu Gly Cys Ser Trp Glu Phe Ile Pro
 1280 1285 1290

Val Asp Asp Gly Trp Gly Glu Arg Pro Leu
 1295 1300

<210> 8
 <211> 1322
 <212> PRT
 <213> Clostridium tetani

<400> 8

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

105703P502PC.ST25.txt

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

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

Val Asn Thr Asn Ala Phe Arg Asn Val Asp Gly Ser Gly Leu Val Ser
420 425 430

Lys Leu Ile Gly Leu Cys Lys Lys Ile Ile Pro Pro Pro Val Lys Gln
435 440 445

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

Pro Gly Pro Asp Leu Gly Gly Glu Leu Cys Ile Lys Ile Lys Asn Glu
465 470 475 480

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

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

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

Ile Thr Leu Pro Asn Asp Arg Thr Thr Pro Val Thr Lys Gly Ile Pro
530 535 540

Tyr Ala Pro Glu Tyr Lys Ser Asn Ala Ala Ser Thr Ile Glu Ile His
545 550 555 560

Asn Ile Asp Asp Asn Thr Ile Tyr Gln Tyr Leu Tyr Ala Gln Lys Ser
565 570 575

Pro Thr Thr Leu Gln Arg Ile Thr Met Thr Asn Ser Val Asp Asp Ala
580 585 590

Leu Ile Asn Ser Thr Lys Ile Tyr Ser Tyr Phe Pro Ser Val Ile Ser
595 600 605

Lys Val Asn Gln Gly Ala Gln Gly Ile Leu Phe Leu Gln Trp Val Arg
610 615 620

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

Asp Lys Ile Ser Asp Val Ser Thr Ile Val Pro Tyr Ile Gly Pro Ala
645 650 655

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Leu Asn Ile Val Lys Gln Gly Tyr Glu Gly Asn Phe Ile Gly Ala Leu
 660 665 670
 Glu Thr Thr Gly Val Val Leu Leu Leu Glu Tyr Ile Pro Glu Ile Thr
 675 680 685
 Leu Pro Val Ile Ala Ala Leu Ser Ile Ala Glu Ser Ser Thr Gln Lys
 690 695 700
 Glu Lys Ile Ile Lys Thr Ile Asp Asn Phe Leu Glu Lys Arg Tyr Glu
 705 710 715 720
 Lys Trp Ile Glu Val Tyr Lys Leu Val Lys Ala Lys Trp Leu Gly Thr
 725 730 735
 Val Asn Thr Gln Phe Gln Lys Arg Ser Tyr Gln Met Tyr Arg Ser Leu
 740 745 750
 Glu Tyr Gln Val Asp Ala Ile Lys Lys Ile Ile Asp Tyr Glu Tyr Lys
 755 760 765
 Ile Tyr Ser Gly Pro Asp Lys Glu Gln Ile Ala Asp Glu Ile Asn Asn
 770 775 780
 Leu Lys Asn Lys Leu Glu Glu Lys Ala Asn Lys Ala Met Ile Asn Ile
 785 790 795 800
 Asn Ile Phe Met Arg Glu Ser Ser Arg Ser Phe Leu Val Asn Gln Met
 805 810 815
 Ile Asn Glu Ala Lys Lys Gln Leu Leu Glu Phe Asp Thr Gln Ser Lys
 820 825 830
 Asn Ile Leu Met Gln Tyr Ile Lys Ala Asn Ser Lys Phe Ile Gly Ile
 835 840 845
 Thr Glu Leu Lys Lys Leu Glu Ser Lys Ile Asn Lys Val Phe Ser Thr
 850 855 860
 Pro Ile Pro Phe Ser Tyr Ser Lys Asn Leu Asp Cys Trp Val Asp Asn
 865 870 875 880
 Glu Glu Asp Ile Asp Val Ile Leu Lys Lys Ser Thr Ile Leu Asn Leu
 885 890 895
 Asp Ile Asn Asn Asp Ile Ile Ser Asp Ile Ser Gly Phe Asn Ser Ser
 900 905 910
 Val Ile Thr Tyr Pro Asp Ala Gln Leu Val Pro Gly Ile Asn Gly Lys
 915 920 925

105703P502PC.ST25.txt

Ala Ile His Leu Val Asn Asn Glu Ser Ser Glu Val Ile Val His Lys
930 935 940

Ala Met Asp Ile Glu Tyr Asn Asp Met Phe Asn Asn Phe Thr Val Ser
945 950 955 960

Phe Trp Leu Arg Val Pro Lys Val Ser Ala Ser His Leu Glu Gln Tyr
965 970 975

Gly Thr Asn Glu Tyr Ser Ile Ile Ser Ser Met Lys Lys His Ser Leu
980 985 990

Ser Ile Gly Ser Gly Trp Ser Val Ser Leu Lys Gly Asn Asn Leu Ile
995 1000 1005

Trp Thr Leu Lys Asp Ser Ala Gly Glu Val Arg Gln Ile Thr Phe
1010 1015 1020

Arg Asp Leu Pro Asp Lys Phe Asn Ala Tyr Leu Ala Asn Lys Trp
1025 1030 1035

Val Phe Ile Thr Ile Thr Asn Asp Arg Leu Ser Ser Ala Asn Leu
1040 1045 1050

Tyr Ile Asn Gly Val Leu Met Gly Ser Ala Glu Ile Thr Gly Leu
1055 1060 1065

Gly Ala Ile Arg Glu Asp Asn Asn Ile Thr Leu Lys Leu Asp Arg
1070 1075 1080

Cys Asn Asn Asn Asn Gln Tyr Val Ser Ile Asp Lys Phe Arg Ile
1085 1090 1095

Phe Cys Lys Ala Leu Asn Pro Lys Glu Ile Glu Lys Leu Tyr Thr
1100 1105 1110

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

Leu Arg Tyr Asp Thr Glu Tyr Tyr Leu Ile Pro Val Ala Ser Ser
1130 1135 1140

Ser Lys Asp Val Gln Leu Lys Asn Ile Thr Asp Tyr Met Tyr Leu
1145 1150 1155

Thr Asn Ala Pro Ser Tyr Thr Asn Gly Lys Leu Asn Ile Tyr Tyr
1160 1165 1170

Arg Arg Leu Tyr Asn Gly Leu Lys Phe Ile Ile Lys Arg Tyr Thr
1175 1180 1185

105703P502PC.ST25.txt

Pro Asn Asn Glu Ile Asp Ser Phe Val Lys Ser Gly Asp Phe Ile
1190 1195 1200

Lys Leu Tyr Val Ser Tyr Asn Asn Asn Glu His Ile Val Gly Tyr
1205 1210 1215

Pro Lys Asp Gly Asn Ala Phe Asn Asn Leu Asp Arg Ile Leu Arg
1220 1225 1230

Val Gly Tyr Asn Ala Pro Gly Ile Pro Leu Tyr Lys Lys Met Glu
1235 1240 1245

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

Leu Tyr Asp Asp Lys Asn Ala Ser Leu Gly Leu Val Gly Thr His
1265 1270 1275

Asn Gly Gln Ile Gly Asn Asp Pro Asn Arg Asp Ile Leu Ile Ala
1280 1285 1290

Ser Asn Trp Tyr Phe Asn His Leu Lys Asp Lys Ile Leu Gly Cys
1295 1300 1305

Asp Trp Tyr Phe Val Pro Thr Asp Glu Gly Trp Thr Asn Asp
1310 1315 1320