

109970P502PC Sequence listing_ST25.txt
SEQUENCE LISTING

<110> Merz Pharma GmbH & Co. KGaA
<120> NOVEL RECOMBINANT CLOSTRIDIAL NEUROTOXINS WITH INCREASED DURATION
OF EFFECT
<130> 109970P502PC
<150> EP 14 000 791.5
<151> 2014-03-05
<160> 21
<170> PatentIn version 3.5
<210> 1
<211> 20
<212> PRT
<213> Artificial Sequence
<220>
<223> PAS20 sequence_I
<400> 1

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala
20

<210> 2
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
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<400> 2

Ala Ala Pro Ala Ser Pro Ala Pro Ala Ala Pro Ser Ala Pro Ala Pro
1 5 10 15

Ala Ala Pro Ser
20

<210> 3
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> PAS20 sequence_III

<400> 3

Ala Pro Ser Ser Pro Ser Pro Ser Ala Pro Ser Ser Pro Ser Pro Ala
1 5 10 15

Ser Pro Ser Ser
20

109970P502PC Sequence listing_ST25.txt

<210> 4
 <211> 20
 <212> PRT
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<400> 4

Ser Ala Pro Ser Ser Pro Ser Pro Ser Ala Pro Ser Ser Pro Ser Pro
 1 5 10 15

Ala Ser Pro Ser
 20

<210> 5
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<400> 5

Ser Ser Pro Ser Ala Pro Ser Pro Ser Ser Pro Ala Ser Pro Ser Pro
 1 5 10 15

Ser Ser Pro Ala
 20

<210> 6
 <211> 24
 <212> PRT
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<400> 6

Ala Ala Ser Pro Ala Ala Pro Ser Ala Pro Pro Ala Ala Ala Ser Pro
 1 5 10 15

Ala Ala Pro Ser Ala Pro Pro Ala
 20

<210> 7
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> PAS20 sequence_VI

<400> 7

Ala Ser Ala Ala Ala Pro Ala Ala Ala Ser Ala Ala Ala Ser Ala Pro
 1 5 10 15

109970P502PC Sequence listing_ST25.txt

Ser Ala Ala Ala
20

<210> 8
<211> 1546
<212> PRT
<213> Artificial Sequence

<220>
<223> PAS200 rBoNT/A: protein sequence

<400> 8

Met Gly Ser Ser His His His His His His Gly Ser Leu Val Pro Arg
1 5 10 15

Ser Ser Ser Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala
20 25 30

Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala
35 40 45

Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala
50 55 60

Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala
65 70 75 80

Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser
85 90 95

Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala
100 105 110

Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala
115 120 125

Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala
130 135 140

Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala
145 150 155 160

Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser
165 170 175

Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala
180 185 190

Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala
195 200 205

109970P502PC Sequence Listing_ST25.txt

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Ser  Pro  Ala  Ala  Pro  Ala  Pro  Ser  Ala  Pro  Ala  Ala  Pro  Phe  Val  Asn
210                                215                                220

Lys  Gln  Phe  Asn  Tyr  Lys  Asp  Pro  Val  Asn  Gly  Val  Asp  Ile  Ala  Tyr
225                                230                                235                                240

Ile  Lys  Ile  Pro  Asn  Ala  Gly  Gln  Met  Gln  Pro  Val  Lys  Ala  Phe  Lys
245                                250                                255

Ile  His  Asn  Lys  Ile  Trp  Val  Ile  Pro  Glu  Arg  Asp  Thr  Phe  Thr  Asn
260                                265                                270

Pro  Glu  Glu  Gly  Asp  Leu  Asn  Pro  Pro  Pro  Glu  Ala  Lys  Gln  Val  Pro
275                                280                                285

Val  Ser  Tyr  Tyr  Asp  Ser  Thr  Tyr  Leu  Ser  Thr  Asp  Asn  Glu  Lys  Asp
290                                295                                300

Asn  Tyr  Leu  Lys  Gly  Val  Thr  Lys  Leu  Phe  Glu  Arg  Ile  Tyr  Ser  Thr
305                                310                                315                                320

Asp  Leu  Gly  Arg  Met  Leu  Leu  Thr  Ser  Ile  Val  Arg  Gly  Ile  Pro  Phe
325                                330                                335

Trp  Gly  Gly  Ser  Thr  Ile  Asp  Thr  Glu  Leu  Lys  Val  Ile  Asp  Thr  Asn
340                                345                                350

Cys  Ile  Asn  Val  Ile  Gln  Pro  Asp  Gly  Ser  Tyr  Arg  Ser  Glu  Glu  Leu
355                                360                                365

Asn  Leu  Val  Ile  Ile  Gly  Pro  Ser  Ala  Asp  Ile  Ile  Gln  Phe  Glu  Cys
370                                375                                380

Lys  Ser  Phe  Gly  His  Glu  Val  Leu  Asn  Leu  Thr  Arg  Asn  Gly  Tyr  Gly
385                                390                                395                                400

Ser  Thr  Gln  Tyr  Ile  Arg  Phe  Ser  Pro  Asp  Phe  Thr  Phe  Gly  Phe  Glu
405                                410                                415

Glu  Ser  Leu  Glu  Val  Asp  Thr  Asn  Pro  Leu  Leu  Gly  Ala  Gly  Lys  Phe
420                                425                                430

Ala  Thr  Asp  Pro  Ala  Val  Thr  Leu  Ala  His  Glu  Leu  Ile  His  Ala  Gly
435                                440                                445

His  Arg  Leu  Tyr  Gly  Ile  Ala  Ile  Asn  Pro  Asn  Arg  Val  Phe  Lys  Val
450                                455                                460

Asn  Thr  Asn  Ala  Tyr  Tyr  Glu  Met  Ser  Gly  Leu  Glu  Val  Ser  Phe  Glu
465                                470                                475                                480

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109970P502PC Sequence listing_ST25.txt

Glu Leu Arg Thr Phe Gly Gly His Asp Ala Lys Phe Ile Asp Ser Leu
485 490 495

Gln Glu Asn Glu Phe Arg Leu Tyr Tyr Tyr Asn Lys Phe Lys Asp Ile
500 505 510

Ala Ser Thr Leu Asn Lys Ala Lys Ser Ile Val Gly Thr Thr Ala Ser
515 520 525

Leu Gln Tyr Met Lys Asn Val Phe Lys Glu Lys Tyr Leu Leu Ser Glu
530 535 540

Asp Thr Ser Gly Lys Phe Ser Val Asp Lys Leu Lys Phe Asp Lys Leu
545 550 555 560

Tyr Lys Met Leu Thr Glu Ile Tyr Thr Glu Asp Asn Phe Val Lys Phe
565 570 575

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

Phe Lys Ile Asn Ile Val Pro Lys Val Asn Tyr Thr Ile Tyr Asp Gly
595 600 605

Phe Asn Leu Arg Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln Asn
610 615 620

Thr Glu Ile Asn Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly
625 630 635 640

Leu Phe Glu Phe Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser
645 650 655

Lys Ala Gly Ala Gly Lys Ser Leu Val Pro Arg Gly Ser Ala Gly Ala
660 665 670

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

Phe Ser Pro Ser Glu Asp Asn Phe Thr Asn Asp Leu Asn Lys Gly Glu
690 695 700

Glu Ile Thr Ser Asp Thr Asn Ile Glu Ala Ala Glu Glu Asn Ile Ser
705 710 715 720

Leu Asp Leu Ile Gln Gln Tyr Tyr Leu Thr Phe Asn Phe Asp Asn Glu
725 730 735

Pro Glu Asn Ile Ser Ile Glu Asn Leu Ser Ser Asp Ile Ile Gly Gln
740 745 750

109970P502PC Sequence listing_ST25.txt

Leu Glu Leu Met Pro Asn Ile Glu Arg Phe Pro Asn Gly Lys Lys Tyr
755 760 765

Glu Leu Asp Lys Tyr Thr Met Phe His Tyr Leu Arg Ala Gln Glu Phe
770 775 780

Glu His Gly Lys Ser Arg Ile Ala Leu Thr Asn Ser Val Asn Glu Ala
785 790 795 800

Leu Leu Asn Pro Ser Arg Val Tyr Thr Phe Phe Ser Ser Asp Tyr Val
805 810 815

Lys Lys Val Asn Lys Ala Thr Glu Ala Ala Met Phe Leu Gly Trp Val
820 825 830

Glu Gln Leu Val Tyr Asp Phe Thr Asp Glu Thr Ser Glu Val Ser Thr
835 840 845

Thr Asp Lys Ile Ala Asp Ile Thr Ile Ile Ile Pro Tyr Ile Gly Pro
850 855 860

Ala Leu Asn Ile Gly Asn Met Leu Tyr Lys Asp Asp Phe Val Gly Ala
865 870 875 880

Leu Ile Phe Ser Gly Ala Val Ile Leu Leu Glu Phe Ile Pro Glu Ile
885 890 895

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

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

Glu Lys Trp Asp Glu Val Tyr Lys Tyr Ile Val Thr Asn Trp Leu Ala
930 935 940

Lys Val Asn Thr Gln Ile Asp Leu Ile Arg Lys Lys Met Lys Glu Ala
945 950 955 960

Leu Glu Asn Gln Ala Glu Ala Thr Lys Ala Ile Ile Asn Tyr Gln Tyr
965 970 975

Asn Gln Tyr Thr Glu Glu Glu Lys Asn Asn Ile Asn Phe Asn Ile Asp
980 985 990

Asp Leu Ser Ser Lys Leu Asn Glu Ser Ile Asn Lys Ala Met Ile Asn
995 1000 1005

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

109970P502PC Sequence listing_ST25.txt

Ser	Met	Ile	Pro	Tyr	Gly	Val	Lys	Arg	Leu	Glu	Asp	Phe	Asp	Ala
	1025					1030					1035			
Ser	Leu	Lys	Asp	Ala	Leu	Leu	Lys	Tyr	Ile	Tyr	Asp	Asn	Arg	Gly
	1040					1045					1050			
Thr	Leu	Ile	Gly	Gln	Val	Asp	Arg	Leu	Lys	Asp	Lys	Val	Asn	Asn
	1055					1060					1065			
Thr	Leu	Ser	Thr	Asp	Ile	Pro	Phe	Gln	Leu	Ser	Lys	Tyr	Val	Asp
	1070					1075					1080			
Asn	Gln	Arg	Leu	Leu	Ser	Thr	Phe	Thr	Glu	Tyr	Ile	Lys	Asn	Ile
	1085					1090					1095			
Ile	Asn	Thr	Ser	Ile	Leu	Asn	Leu	Arg	Tyr	Glu	Ser	Asn	His	Leu
	1100					1105					1110			
Ile	Asp	Leu	Ser	Arg	Tyr	Ala	Ser	Lys	Ile	Asn	Ile	Gly	Ser	Lys
	1115					1120					1125			
Val	Asn	Phe	Asp	Pro	Ile	Asp	Lys	Asn	Gln	Ile	Gln	Leu	Phe	Asn
	1130					1135					1140			
Leu	Glu	Ser	Ser	Lys	Ile	Glu	Val	Ile	Leu	Lys	Asn	Ala	Ile	Val
	1145					1150					1155			
Tyr	Asn	Ser	Met	Tyr	Glu	Asn	Phe	Ser	Thr	Ser	Phe	Trp	Ile	Arg
	1160					1165					1170			
Ile	Pro	Lys	Tyr	Phe	Asn	Ser	Ile	Ser	Leu	Asn	Asn	Glu	Tyr	Thr
	1175					1180					1185			
Ile	Ile	Asn	Cys	Met	Glu	Asn	Asn	Ser	Gly	Trp	Lys	Val	Ser	Leu
	1190					1195					1200			
Asn	Tyr	Gly	Glu	Ile	Ile	Trp	Thr	Leu	Gln	Asp	Thr	Gln	Glu	Ile
	1205					1210					1215			
Lys	Gln	Arg	Val	Val	Phe	Lys	Tyr	Ser	Gln	Met	Ile	Asn	Ile	Ser
	1220					1225					1230			
Asp	Tyr	Ile	Asn	Arg	Trp	Ile	Phe	Val	Thr	Ile	Thr	Asn	Asn	Arg
	1235					1240					1245			
Leu	Asn	Asn	Ser	Lys	Ile	Tyr	Ile	Asn	Gly	Arg	Leu	Ile	Asp	Gln
	1250					1255					1260			
Lys	Pro	Ile	Ser	Asn	Leu	Gly	Asn	Ile	His	Ala	Ser	Asn	Asn	Ile
	1265					1270					1275			

109970P502PC Sequence listing_ST25.txt

Met	Phe	Lys	Leu	Asp	Gly	Cys	Arg	Asp	Thr	His	Arg	Tyr	Ile	Trp
	1280					1285						1290		
Ile	Lys	Tyr	Phe	Asn	Leu	Phe	Asp	Lys	Glu	Leu	Asn	Glu	Lys	Glu
	1295					1300					1305			
Ile	Lys	Asp	Leu	Tyr	Asp	Asn	Gln	Ser	Asn	Ser	Gly	Ile	Leu	Lys
	1310					1315					1320			
Asp	Phe	Trp	Gly	Asp	Tyr	Leu	Gln	Tyr	Asp	Lys	Pro	Tyr	Tyr	Met
	1325					1330					1335			
Leu	Asn	Leu	Tyr	Asp	Pro	Asn	Lys	Tyr	Val	Asp	Val	Asn	Asn	Val
	1340					1345					1350			
Gly	Ile	Arg	Gly	Tyr	Met	Tyr	Leu	Lys	Gly	Pro	Arg	Gly	Ser	Val
	1355					1360					1365			
Met	Thr	Thr	Asn	Ile	Tyr	Leu	Asn	Ser	Ser	Leu	Tyr	Arg	Gly	Thr
	1370					1375					1380			
Lys	Phe	Ile	Ile	Lys	Lys	Tyr	Ala	Ser	Gly	Asn	Lys	Asp	Asn	Ile
	1385					1390					1395			
Val	Arg	Asn	Asn	Asp	Arg	Val	Tyr	Ile	Asn	Val	Val	Val	Lys	Asn
	1400					1405					1410			
Lys	Glu	Tyr	Arg	Leu	Ala	Thr	Asn	Ala	Ser	Gln	Ala	Gly	Val	Glu
	1415					1420					1425			
Lys	Ile	Leu	Ser	Ala	Leu	Glu	Ile	Pro	Asp	Val	Gly	Asn	Leu	Ser
	1430					1435					1440			
Gln	Val	Val	Val	Met	Lys	Ser	Lys	Asn	Asp	Gln	Gly	Ile	Thr	Asn
	1445					1450					1455			
Lys	Cys	Lys	Met	Asn	Leu	Gln	Asp	Asn	Asn	Gly	Asn	Asp	Ile	Gly
	1460					1465					1470			
Phe	Ile	Gly	Phe	His	Gln	Phe	Asn	Asn	Ile	Ala	Lys	Leu	Val	Ala
	1475					1480					1485			
Ser	Asn	Trp	Tyr	Asn	Arg	Gln	Ile	Glu	Arg	Ser	Ser	Arg	Thr	Leu
	1490					1495					1500			
Gly	Cys	Ser	Trp	Glu	Phe	Ile	Pro	Val	Asp	Asp	Gly	Trp	Gly	Glu
	1505					1510					1515			
Arg	Pro	Leu	Gly	Asp	Leu	Val	Pro	Arg	Gly	Ser	Ala	Asn	Ser	Ser
	1520					1525					1530			

109970P502PC Sequence listing_ST25.txt

Ser Val Asp Lys Leu Trp Ser His Pro Gln Phe Glu Lys
1535 1540 1545

<210> 9
<211> 1446
<212> PRT
<213> Artificial Sequence

<220>
<223> PAS100 rBONT/A: protein sequence

<400> 9

Met Gly Ser Ser His His His His His Gly Ser Leu Val Pro Arg
1 5 10 15

Ser Ser Ser Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala
20 25 30

Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala
35 40 45

Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala
50 55 60

Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala
65 70 75 80

Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser
85 90 95

Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala
100 105 110

Pro Ala Pro Ser Ala Pro Ala Ala Pro Phe Val Asn Lys Gln Phe Asn
115 120 125

Tyr Lys Asp Pro Val Asn Gly Val Asp Ile Ala Tyr Ile Lys Ile Pro
130 135 140

Asn Ala Gly Gln Met Gln Pro Val Lys Ala Phe Lys Ile His Asn Lys
145 150 155 160

Ile Trp Val Ile Pro Glu Arg Asp Thr Phe Thr Asn Pro Glu Glu Gly
165 170 175

Asp Leu Asn Pro Pro Pro Glu Ala Lys Gln Val Pro Val Ser Tyr Tyr
180 185 190

Asp Ser Thr Tyr Leu Ser Thr Asp Asn Glu Lys Asp Asn Tyr Leu Lys
195 200 205

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

109970P502PC Sequence listing_ST25.txt

Met Leu Leu Thr Ser Ile Val Arg Gly Ile Pro Phe Trp Gly Gly Ser
225 230 235 240

Thr Ile Asp Thr Glu Leu Lys Val Ile Asp Thr Asn Cys Ile Asn Val
245 250 255

Ile Gln Pro Asp Gly Ser Tyr Arg Ser Glu Glu Leu Asn Leu Val Ile
260 265 270

Ile Gly Pro Ser Ala Asp Ile Ile Gln Phe Glu Cys Lys Ser Phe Gly
275 280 285

His Glu Val Leu Asn Leu Thr Arg Asn Gly Tyr Gly Ser Thr Gln Tyr
290 295 300

Ile Arg Phe Ser Pro Asp Phe Thr Phe Gly Phe Glu Glu Ser Leu Glu
305 310 315 320

Val Asp Thr Asn Pro Leu Leu Gly Ala Gly Lys Phe Ala Thr Asp Pro
325 330 335

Ala Val Thr Leu Ala His Glu Leu Ile His Ala Gly His Arg Leu Tyr
340 345 350

Gly Ile Ala Ile Asn Pro Asn Arg Val Phe Lys Val Asn Thr Asn Ala
355 360 365

Tyr Tyr Glu Met Ser Gly Leu Glu Val Ser Phe Glu Glu Leu Arg Thr
370 375 380

Phe Gly Gly His Asp Ala Lys Phe Ile Asp Ser Leu Gln Glu Asn Glu
385 390 395 400

Phe Arg Leu Tyr Tyr Tyr Asn Lys Phe Lys Asp Ile Ala Ser Thr Leu
405 410 415

Asn Lys Ala Lys Ser Ile Val Gly Thr Thr Ala Ser Leu Gln Tyr Met
420 425 430

Lys Asn Val Phe Lys Glu Lys Tyr Leu Leu Ser Glu Asp Thr Ser Gly
435 440 445

Lys Phe Ser Val Asp Lys Leu Lys Phe Asp Lys Leu Tyr Lys Met Leu
450 455 460

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

Asn Arg Lys Thr Tyr Leu Asn Phe Asp Lys Ala Val Phe Lys Ile Asn
485 490 495

109970P502PC Sequence listing_ST25.txt

Ile Val Pro Lys Val Asn Tyr Thr Ile Tyr Asp Gly Phe Asn Leu Arg
500 505 510

Asn Thr Asn Leu Ala Ala Asn Phe Asn Gly Gln Asn Thr Glu Ile Asn
515 520 525

Asn Met Asn Phe Thr Lys Leu Lys Asn Phe Thr Gly Leu Phe Glu Phe
530 535 540

Tyr Lys Leu Leu Cys Val Arg Gly Ile Ile Thr Ser Lys Ala Gly Ala
545 550 555 560

Gly Lys Ser Leu Val Pro Arg Gly Ser Ala Gly Ala Gly Ala Leu Asn
565 570 575

Asp Leu Cys Ile Lys Val Asn Asn Trp Asp Leu Phe Phe Ser Pro Ser
580 585 590

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

Asp Thr Asn Ile Glu Ala Ala Glu Glu Asn Ile Ser Leu Asp Leu Ile
610 615 620

Gln Gln Tyr Tyr Leu Thr Phe Asn Phe Asp Asn Glu Pro Glu Asn Ile
625 630 635 640

Ser Ile Glu Asn Leu Ser Ser Asp Ile Ile Gly Gln Leu Glu Leu Met
645 650 655

Pro Asn Ile Glu Arg Phe Pro Asn Gly Lys Lys Tyr Glu Leu Asp Lys
660 665 670

Tyr Thr Met Phe His Tyr Leu Arg Ala Gln Glu Phe Glu His Gly Lys
675 680 685

Ser Arg Ile Ala Leu Thr Asn Ser Val Asn Glu Ala Leu Leu Asn Pro
690 695 700

Ser Arg Val Tyr Thr Phe Phe Ser Ser Asp Tyr Val Lys Lys Val Asn
705 710 715 720

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

Tyr Asp Phe Thr Asp Glu Thr Ser Glu Val Ser Thr Thr Asp Lys Ile
740 745 750

Ala Asp Ile Thr Ile Ile Ile Pro Tyr Ile Gly Pro Ala Leu Asn Ile
755 760 765

109970P502PC Sequence listing_ST25.txt

Gly Asn Met Leu Tyr Lys Asp Asp Phe Val Gly Ala Leu Ile Phe Ser
770 775 780

Gly Ala Val Ile Leu Leu Glu Phe Ile Pro Glu Ile Ala Ile Pro Val
785 790 795 800

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

Val Gln Thr Ile Asp Asn Ala Leu Ser Lys Arg Asn Glu Lys Trp Asp
820 825 830

Glu Val Tyr Lys Tyr Ile Val Thr Asn Trp Leu Ala Lys Val Asn Thr
835 840 845

Gln Ile Asp Leu Ile Arg Lys Lys Met Lys Glu Ala Leu Glu Asn Gln
850 855 860

Ala Glu Ala Thr Lys Ala Ile Ile Asn Tyr Gln Tyr Asn Gln Tyr Thr
865 870 875 880

Glu Glu Glu Lys Asn Asn Ile Asn Phe Asn Ile Asp Asp Leu Ser Ser
885 890 895

Lys Leu Asn Glu Ser Ile Asn Lys Ala Met Ile Asn Ile Asn Lys Phe
900 905 910

Leu Asn Gln Cys Ser Val Ser Tyr Leu Met Asn Ser Met Ile Pro Tyr
915 920 925

Gly Val Lys Arg Leu Glu Asp Phe Asp Ala Ser Leu Lys Asp Ala Leu
930 935 940

Leu Lys Tyr Ile Tyr Asp Asn Arg Gly Thr Leu Ile Gly Gln Val Asp
945 950 955 960

Arg Leu Lys Asp Lys Val Asn Asn Thr Leu Ser Thr Asp Ile Pro Phe
965 970 975

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

Glu Tyr Ile Lys Asn Ile Ile Asn Thr Ser Ile Leu Asn Leu Arg Tyr
995 1000 1005

Glu Ser Asn His Leu Ile Asp Leu Ser Arg Tyr Ala Ser Lys Ile
1010 1015 1020

Asn Ile Gly Ser Lys Val Asn Phe Asp Pro Ile Asp Lys Asn Gln
1025 1030 1035

109970P502PC Sequence listing_ST25.txt

Ile	Gln	Leu	Phe	Asn	Leu	Glu	Ser	Ser	Lys	Ile	Glu	Val	Ile	Leu
	1040					1045					1050			
Lys	Asn	Ala	Ile	Val	Tyr	Asn	Ser	Met	Tyr	Glu	Asn	Phe	Ser	Thr
	1055					1060					1065			
Ser	Phe	Trp	Ile	Arg	Ile	Pro	Lys	Tyr	Phe	Asn	Ser	Ile	Ser	Leu
	1070					1075					1080			
Asn	Asn	Glu	Tyr	Thr	Ile	Ile	Asn	Cys	Met	Glu	Asn	Asn	Ser	Gly
	1085					1090					1095			
Trp	Lys	Val	Ser	Leu	Asn	Tyr	Gly	Glu	Ile	Ile	Trp	Thr	Leu	Gln
	1100					1105					1110			
Asp	Thr	Gln	Glu	Ile	Lys	Gln	Arg	Val	Val	Phe	Lys	Tyr	Ser	Gln
	1115					1120					1125			
Met	Ile	Asn	Ile	Ser	Asp	Tyr	Ile	Asn	Arg	Trp	Ile	Phe	Val	Thr
	1130					1135					1140			
Ile	Thr	Asn	Asn	Arg	Leu	Asn	Asn	Ser	Lys	Ile	Tyr	Ile	Asn	Gly
	1145					1150					1155			
Arg	Leu	Ile	Asp	Gln	Lys	Pro	Ile	Ser	Asn	Leu	Gly	Asn	Ile	His
	1160					1165					1170			
Ala	Ser	Asn	Asn	Ile	Met	Phe	Lys	Leu	Asp	Gly	Cys	Arg	Asp	Thr
	1175					1180					1185			
His	Arg	Tyr	Ile	Trp	Ile	Lys	Tyr	Phe	Asn	Leu	Phe	Asp	Lys	Glu
	1190					1195					1200			
Leu	Asn	Glu	Lys	Glu	Ile	Lys	Asp	Leu	Tyr	Asp	Asn	Gln	Ser	Asn
	1205					1210					1215			
Ser	Gly	Ile	Leu	Lys	Asp	Phe	Trp	Gly	Asp	Tyr	Leu	Gln	Tyr	Asp
	1220					1225					1230			
Lys	Pro	Tyr	Tyr	Met	Leu	Asn	Leu	Tyr	Asp	Pro	Asn	Lys	Tyr	Val
	1235					1240					1245			
Asp	Val	Asn	Asn	Val	Gly	Ile	Arg	Gly	Tyr	Met	Tyr	Leu	Lys	Gly
	1250					1255					1260			
Pro	Arg	Gly	Ser	Val	Met	Thr	Thr	Asn	Ile	Tyr	Leu	Asn	Ser	Ser
	1265					1270					1275			
Leu	Tyr	Arg	Gly	Thr	Lys	Phe	Ile	Ile	Lys	Lys	Tyr	Ala	Ser	Gly
	1280					1285					1290			

109970P502PC Sequence listing_ST25.txt

Asn Lys Asp Asn Ile Val Arg Asn Asn Asp Arg Val Tyr Ile Asn
1295 1300 1305

Val Val Val Lys Asn Lys Glu Tyr Arg Leu Ala Thr Asn Ala Ser
1310 1315 1320

Gln Ala Gly Val Glu Lys Ile Leu Ser Ala Leu Glu Ile Pro Asp
1325 1330 1335

Val Gly Asn Leu Ser Gln Val Val Val Met Lys Ser Lys Asn Asp
1340 1345 1350

Gln Gly Ile Thr Asn Lys Cys Lys Met Asn Leu Gln Asp Asn Asn
1355 1360 1365

Gly Asn Asp Ile Gly Phe Ile Gly Phe His Gln Phe Asn Asn Ile
1370 1375 1380

Ala Lys Leu Val Ala Ser Asn Trp Tyr Asn Arg Gln Ile Glu Arg
1385 1390 1395

Ser Ser Arg Thr Leu Gly Cys Ser Trp Glu Phe Ile Pro Val Asp
1400 1405 1410

Asp Gly Trp Gly Glu Arg Pro Leu Gly Asp Leu Val Pro Arg Gly
1415 1420 1425

Ser Ala Asn Ser Ser Ser Val Asp Lys Leu Trp Ser His Pro Gln
1430 1435 1440

Phe Glu Lys
1445

<210> 10
<211> 4641
<212> DNA
<213> Artificial Sequence

<220>
<223> PAS200 rBoNT/A: DNA sequence

<400> 10
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tctccagcag cccctgcacc ggcaagccct gcagctccag caccgtcagc accagcagca 180
agcccagctg ctctgtctcc agcgagccca gcagcgccag ctctagtgc cctgtgtgcc 240
tctctgtctg ctccggcacc agcaagtctt gctgcgcctg caccgagtgc tccggctgct 300
agtctgtccg caccagtctc ggctagtcca gctgtctccag ccccttcagc tccggcagct 360
tcccctgcag cgcctgcccc tgccagtcca gcggctcctg cacctagtgc gcctgcagct 420

109970P502PC Sequence listing_ST25.txt

tcaccggctg	cccctgcgcc	agcttctcct	gcggctccag	ctccatctgc	cccagccgca	480
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ccgccagaag	ccaaacaagt	gccggtgagc	tactatgata	gcacgtatct	tagcaccgat	900
aatgaaaaag	acaattacct	gaagggcggtg	accaagttgt	tcgagcgcat	ctacagtacc	960
gacttaggcc	gcatgttggt	gacgagcatc	gttcgcggta	tcccgttctg	gggcgggctcg	1020
accattgata	ccgagttgaa	agtcattgac	acgaactgta	tcaatgttat	ccaaccggac	1080
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ggcaagtcct	tggttccgcg	tggcagcgcc	ggcgccggcg	cgctcaatga	tctgtgtatt	2040
aaagtcaata	actgggacct	gttcttcagc	ccgagcgagg	ataactttac	caacgactta	2100
aacaaaggcg	aggagatcac	gagcgatacg	aacatcgagg	cggcggagga	aaatattagc	2160
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109970P502PC Sequence listing_ST25.txt

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tacatcggtc cggcgctcaa tatcggcaat atgttataca aggacgactt tgtgggcgcg	2640
ctgatcttta gcggcgcggt tatcttatta gaattcatcc cggagatcgc aatcccggtc	2700
ttgggcacct ttgcgttggt gagctatatc gcgaataaag tgctcacggt ccaaaccatc	2760
gataacgcgc tcagcaagcg taatgagaaa tgggacgagg ttataagta tatcgtgacc	2820
aactggttag caaaagtcaa tacgcagatc gatctcatcc gcaaaaaaat gaaagaagcc	2880
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109970P502PC Sequence listing_ST25.txt

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<210> 11
 <211> 4341
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> PAS100 rBoNT/A: DNA sequence

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agtcctgccg caccagctcc ggctagtcca gctgctccag ccccttcagc ccctgcagca	360
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109970P502PC Sequence listing_ST25.txt

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109970P502PC Sequence listing_ST25.txt

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<210> 12
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> PAS60 to PAS500: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 3 to 25

<220>
<221> REPEAT
<222> (1)..(20)
<223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 3 to 25

<400> 12

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1 5 10 15

Ser Ala Pro Ala
20

<210> 13
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> PAS80 to PAS160: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 4 to 8

<220>
<221> REPEAT
<222> (1)..(20)
<223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 4

109970P502PC Sequence listing_ST25.txt

to 8

<400> 13

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala
20

<210> 14

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> PAS100 to PAS200: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 5 to 10

<220>

<221> REPEAT

<222> (1)..(20)

<223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 5 to 10

<400> 14

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala
20

<210> 15

<211> 100

<212> PRT

<213> Artificial Sequence

<220>

<223> PAS100: (ASPAAPAPASPAAPAPSAPA)n, with n being 5

<400> 15

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala
20 25 30

Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro
35 40 45

Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala
50 55 60

Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala
65 70 75 80

109970P502PC Sequence listing_ST25.txt

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
85 90 95

Ser Ala Pro Ala
100

<210> 16
<211> 200
<212> PRT
<213> Artificial Sequence

<220>
<223> PAS200: (ASPAAPAPASPAAPAPSAPA)n, with n being 10

<400> 16

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala
20 25 30

Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro
35 40 45

Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala
50 55 60

Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala
65 70 75 80

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
85 90 95

Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala
100 105 110

Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro
115 120 125

Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala Ala Ser Pro Ala
130 135 140

Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro Ser Ala Pro Ala
145 150 155 160

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
165 170 175

Ser Ala Pro Ala Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala
180 185 190

Ala Pro Ala Pro Ser Ala Pro Ala
195 200

109970P502PC Sequence listing_ST25.txt

<210> 17
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> PAS100 to PAS3000: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 5 to 150

<220>
 <221> REPEAT
 <222> (1)..(20)
 <223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 5 to 150

<400> 17

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
 1 5 10 15

Ser Ala Pro Ala
 20

<210> 18
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> PAS120 to PAS400: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 6 to 20

<220>
 <221> REPEAT
 <222> (1)..(20)
 <223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 6 to 20

<400> 18

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
 1 5 10 15

Ser Ala Pro Ala
 20

<210> 19
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> PAS140 to PAS260: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 7 to 13

<220>
 <221> REPEAT
 <222> (1)..(20)
 <223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 7

109970P502PC Sequence listing_ST25.txt

to 13

<400> 19

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala
20

<210> 20

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> PAS160 to PAS240: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 8 to 12

<220>

<221> REPEAT

<222> (1)..(20)

<223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 8 to 12

<400> 20

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala
20

<210> 21

<211> 20

<212> PRT

<213> Artificial Sequence

<220>

<223> PAS180 to PAS220: (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 9 to 11

<220>

<221> REPEAT

<222> (1)..(20)

<223> (ASPAAPAPASPAAPAPSAPA)n, with n being an integer selected from 9 to 11

<400> 21

Ala Ser Pro Ala Ala Pro Ala Pro Ala Ser Pro Ala Ala Pro Ala Pro
1 5 10 15

Ser Ala Pro Ala
20