

# SEQUENCE LISTING

<110> Merz Pharma GmbH & Co. KGaA

<120> Means and methods for manufacturing highly pure Neurotoxin

<130> MP65985PC

<160> 24

<170> PatentIn version 3.5

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Ile Cys Ile Glu Ile  
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Pro Arg Leu Cys Ile Arg Val  
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Gln Cys Ile Ile Val  
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Val Lys Ala Phe Lys Ile His Asn Lys Ile Trp Val Ile Pro Glu Arg  
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Asp Thr Phe Thr Asn Pro Glu Glu Gly Asp Leu Asn Pro Pro Pro Glu  
50 55 60

Ala Lys Gln Val Pro Val Ser Tyr Tyr Asp Ser Thr Tyr Leu Ser Thr  
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Asp Asn Glu Lys Asp Asn Tyr Leu Lys Gly Val Thr Lys Leu Phe Glu  
85 90 95

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

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

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

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

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

Arg Asn Gly Tyr Gly Ser Thr Gln Tyr Ile Arg Phe Ser Pro Asp Phe  
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Thr Phe Gly Phe Glu Glu Ser Leu Glu Val Asp Thr Asn Pro Leu Leu  
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Asp Leu Ile Gln Gln Tyr Tyr Leu Thr Phe Asn Phe Asp Asn Glu Pro  
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Glu Asn Ile Ser Ile Glu Asn Leu Ser Ser Asp Ile Ile Gly Gln Leu  
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Glu Leu Met Pro Asn Ile Glu Arg Phe Pro Asn Gly Lys Lys Tyr Glu  
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Leu Asp Lys Tyr Thr Met Phe His Tyr Leu Arg Ala Gln Glu Phe Glu  
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His Gly Lys Ser Arg Ile Ala Leu Thr Asn Ser Val Asn Glu Ala Leu  
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Leu Asn Pro Ser Arg Val Tyr Thr Phe Phe Ser Ser Asp Tyr Val Lys  
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Lys Val Asn Lys Ala Thr Glu Ala Ala Met Phe Leu Gly Trp Val Glu  
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Gln Leu Val Tyr Asp Phe Thr Asp Glu Thr Ser Glu Val Ser Thr Thr  
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Asp Lys Ile Ala Asp Ile Thr Ile Ile Ile Pro Tyr Ile Gly Pro Ala  
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Leu Asn Ile Gly Asn Met Leu Tyr Lys Asp Asp Phe Val Gly Ala Leu  
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Ile Phe Ser Gly Ala Val Ile Leu Leu Glu Phe Ile Pro Glu Ile Ala  
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675 680 685

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

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

Glu Asn Gln Ala Glu Ala Thr Lys Ala Ile Ile Asn Tyr Gln Tyr Asn  
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Gln Tyr Thr Glu Glu Glu Lys Asn Asn Ile Asn Phe Asn Ile Asp Asp  
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 Leu Ser Ser Lys Leu Asn Glu Ser Ile Asn Lys Ala Met Ile Asn Ile  
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 Glu Tyr Thr Ile Ile Asn Cys Met Glu Asn Asn Ser Gly Trp Lys Val  
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 Ile Lys Asp Leu Tyr Asp Asn Gln Ser Asn Ser Gly Ile Leu Lys  
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 Asp Phe Trp Gly Asp Tyr Leu Gln Tyr Asp Lys Pro Tyr Tyr Met  
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 Gly Ile Arg Gly Tyr Met Tyr Leu Lys Gly Pro Arg Gly Ser Val  
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 Met Thr Thr Asn Ile Tyr Leu Asn Ser Ser Leu Tyr Arg Gly Thr  
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 Lys Phe Ile Ile Lys Lys Tyr Ala Ser Gly Asn Lys Asp Asn Ile  
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 Val Arg Asn Asn Asp Arg Val Tyr Ile Asn Val Val Val Lys Asn  
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 Lys Glu Tyr Arg Leu Ala Thr Asn Ala Ser Gln Ala Gly Val Glu  
 1190 1195 1200  
 Lys Ile Leu Ser Ala Leu Glu Ile Pro Asp Val Gly Asn Leu Ser  
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 Gln Val Val Val Met Lys Ser Lys Asn Asp Gln Gly Ile Thr Asn  
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 Lys Cys Lys Met Asn Leu Gln Asp Asn Asn Gly Asn Asp Ile Gly  
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 Phe Ile Gly Phe His Gln Phe Asn Asn Ile Ala Lys Leu Val Ala  
 1250 1255 1260  
 Ser Asn Trp Tyr Asn Arg Gln Ile Glu Arg Ser Ser Arg Thr Leu  
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 Gly Cys Ser Trp Glu Phe Ile Pro Val Asp Asp Gly Trp Gly Glu



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Arg Pro Leu  
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<213> Clostridium botulinum

<400> 18

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Tyr Tyr Lys Ala Phe Lys Ile Thr Asp Arg Ile Trp Ile Ile Pro Glu  
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Arg Tyr Thr Phe Gly Tyr Lys Pro Glu Asp Phe Asn Lys Ser Ser Gly  
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Ile Phe Asn Arg Asp Val Cys Glu Tyr Tyr Asp Pro Asp Tyr Leu Asn  
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Thr Asn Asp Lys Lys Asn Ile Phe Leu Gln Thr Met Ile Lys Leu Phe  
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Asn Arg Ile Lys Ser Lys Pro Leu Gly Glu Lys Leu Leu Glu Met Ile  
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Ile Asn Gly Ile Pro Tyr Leu Gly Asp Arg Arg Val Pro Leu Glu Glu  
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Phe Asn Thr Asn Ile Ala Ser Val Thr Val Asn Lys Leu Ile Ser Asn  
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Pro Gly Glu Val Glu Arg Lys Lys Gly Ile Phe Ala Asn Leu Ile Ile  
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Phe Gly Pro Gly Pro Val Leu Asn Glu Asn Glu Thr Ile Asp Ile Gly  
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Ile Gln Asn His Phe Ala Ser Arg Glu Gly Phe Gly Gly Ile Met Gln  
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Met Lys Phe Cys Pro Glu Tyr Val Ser Val Phe Asn Asn Val Gln Glu  
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Asn Lys Gly Ala Ser Ile Phe Asn Arg Arg Gly Tyr Phe Ser Asp Pro  
                                    210                                      215                                      220

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

Gly Ile Lys Val Asp Asp Leu Pro Ile Val Pro Asn Glu Lys Lys Phe  
245 250 255

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

Gly Gly Gln Asp Pro Ser Ile Ile Thr Pro Ser Thr Asp Lys Ser Ile  
275 280 285

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

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

Lys Asn Lys Phe Lys Asp Lys Tyr Lys Phe Val Glu Asp Ser Glu Gly  
325 330 335

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

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

Thr Arg Ala Ser Tyr Phe Ser Asp Ser Leu Pro Pro Val Lys Ile Lys  
370 375 380

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

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

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

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

Phe Asn Asp Ile Asn Ser Lys Leu Asn Glu Gly Ile Asn Gln Ala Ile  
755 760 765

Asp Asn Ile Asn Asn Phe Ile Asn Gly Cys Ser Val Ser Tyr Leu Met  
Seite 11

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

Ile	Trp	Met	Lys	Tyr	Phe	Ser	Ile	Phe	Asn	Thr	Glu	Leu	Ser	Gln
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Ser	Asn	Ile	Glu	Glu	Arg	Tyr	Lys	Ile	Gln	Ser	Tyr	Ser	Glu	Tyr
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Leu	Lys	Asp	Phe	Trp	Gly	Asn	Pro	Leu	Met	Tyr	Asn	Lys	Glu	Tyr
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Lys	Phe	Ile	Ile	Arg	Arg	Lys	Ser	Asn	Ser	Gln	Ser	Ile	Asn	Asp
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Asp	Ile	Val	Arg	Lys	Glu	Asp	Tyr	Ile	Tyr	Leu	Asp	Phe	Phe	Asn
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Leu	Asn	Gln	Glu	Trp	Arg	Val	Tyr	Thr	Tyr	Lys	Tyr	Phe	Lys	Lys
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Phe	Tyr	Asn	Thr	Ile	Gln	Ile	Lys	Glu	Tyr	Asp	Glu	Gln	Pro	Thr
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Tyr	Ser	Cys	Gln	Leu	Leu	Phe	Lys	Lys	Asp	Glu	Glu	Ser	Thr	Asp
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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
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Leu	Lys	Glu	Val	Lys	Arg	Lys	Pro	Tyr	Asn	Leu	Lys	Leu	Gly	Cys
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<213> Clostridium botulinum

<400> 19

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

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  
Seite 14

260										265										270										
Phe	Gly	Gly	Pro	Thr	Ile	Asp	Leu	Ile	Pro	Lys	Ser	Ala	Arg	Lys	Tyr															
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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															
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Ser	Gly	Glu	Val	Ala	Val	Asp	Arg	Asn	Lys	Phe	Ala	Glu	Leu	Tyr	Lys															
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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															
	370					375					380																			
Ala	Asn	Ile	Leu	Asp	Asp	Asn	Val	Tyr	Asp	Ile	Gln	Asn	Gly	Phe	Asn															
385					390					395					400															
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

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

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

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  
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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  
1100 1105 1110

Tyr Ile Ala Pro Lys Ser Asn Ile Leu Val Leu Val Gln Tyr Pro  
1115 1120 1125

Asp Arg Ser Lys Leu Tyr Thr Gly Asn Pro Ile Thr Ile Lys Ser  
1130 1135 1140

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

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  
1175 1180 1185

Lys Asn Cys Val Tyr Ala Leu Lys Leu Gln Ser Asn Leu Gly Asn  
1190 1195 1200

Tyr Gly Ile Gly Ile Phe Ser Ile Lys Asn Ile Val Ser Gln Asn  
1205 1210 1215

Lys Tyr Cys Ser Gln Ile Phe Ser Ser Phe Met Lys Asn Thr Met  
1220 1225 1230

Leu Leu Ala Asp Ile Tyr Lys Pro Trp Arg Phe Ser Phe Glu Asn  
1235 1240 1245

Ala Tyr Thr Pro Val Ala Val Thr Asn Tyr Glu Thr Lys Leu Leu  
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Ser Thr Ser Ser Phe Trp Lys Phe Ile Ser Arg Asp Pro Gly Trp  
1265 1270 1275

Val Glu  
1280

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<400> 20

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Asn Asp Ile Leu Tyr Leu Arg Ile Pro Gln Asn Lys Leu Ile Thr Thr  
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Pro Val Lys<sub>35</sub> Ala Phe Met Ile Thr Gln Asn Ile Trp Val<sub>45</sub> Ile Pro Glu  
 Arg Phe<sub>50</sub> Ser Ser Asp Thr Asn<sub>55</sub> Pro Ser Leu Ser Lys<sub>60</sub> Pro Pro Arg Pro  
 Thr Ser Lys Tyr Gln Ser<sub>70</sub> Tyr Tyr Asp Pro Ser<sub>75</sub> Tyr Leu Ser Thr Asp<sub>80</sub>  
 Glu Gln Lys Asp Thr<sub>85</sub> Phe Leu Lys Gly Ile<sub>90</sub> Ile Lys Leu Phe Lys<sub>95</sub> Arg  
 Ile Asn Glu Arg<sub>100</sub> Asp Ile Gly Lys Lys<sub>105</sub> Leu Ile Asn Tyr Leu<sub>110</sub> Val Val  
 Gly Ser Pro<sub>115</sub> Phe Met Gly Asp Ser<sub>120</sub> Ser Thr Pro Glu Asp<sub>125</sub> Thr Phe Asp  
 Phe Thr<sub>130</sub> Arg His Thr Thr Asn<sub>135</sub> Ile Ala Val Glu Lys<sub>140</sub> Phe Glu Asn Gly  
 Ser Trp Lys Val Thr Asn<sub>150</sub> Ile Ile Thr Pro Ser<sub>155</sub> Val Leu Ile Phe Gly<sub>160</sub>  
 Pro Leu Pro Asn<sub>165</sub> Ile Leu Asp Tyr Thr Ala<sub>170</sub> Ser Leu Thr Leu Gln<sub>175</sub> Gly  
 Gln Gln Ser Asn<sub>180</sub> Pro Ser Phe Glu Gly<sub>185</sub> Phe Gly Thr Leu Ser<sub>190</sub> Ile Leu  
 Lys Val Ala<sub>195</sub> Pro Glu Phe Leu Leu Thr Phe Ser Asp Val<sub>205</sub> Thr Ser Asn  
 Gln Ser<sub>210</sub> Ser Ala Val Leu Gly<sub>215</sub> Lys Ser Ile Phe Cys<sub>220</sub> Met Asp Pro Val  
 Ile Ala Leu Met His Glu<sub>230</sub> Leu Thr His Ser Leu<sub>235</sub> His Gln Leu Tyr Gly<sub>240</sub>  
 Ile Asn Ile Pro Ser<sub>245</sub> Asp Lys Arg Ile Arg<sub>250</sub> Pro Gln Val Ser Glu<sub>255</sub> Gly  
 Phe Phe Ser Gln<sub>260</sub> Asp Gly Pro Asn Val<sub>265</sub> Gln Phe Glu Glu Leu Tyr Thr  
 Phe Gly Gly<sub>275</sub> Ser Asp Val Glu Ile<sub>280</sub> Ile Pro Gln Ile Glu<sub>285</sub> Arg Leu Gln  
 Leu Arg<sub>290</sub> Glu Lys Ala Leu Gly<sub>295</sub> His Tyr Lys Asp Ile<sub>300</sub> Ala Lys Arg Leu

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<sub>580</sub> Leu Ala Glu Lys Val<sub>585</sub> Asn Lys Gly Val Gln Ala Gly<sub>590</sub>

Leu Phe Leu<sub>595</sub> Asn Trp Ala Asn Glu<sub>600</sub> Val Val Glu Asp Phe<sub>605</sub> Thr Thr Asn

Ile Met<sub>610</sub> Lys Lys Asp Thr Leu<sub>615</sub> Asp Lys Ile Ser Asp<sub>620</sub> Val Ser Ala Ile

Ile Pro Tyr Ile Gly Pro<sub>630</sub> Ala Leu Asn Ile Gly<sub>635</sub> Asn Ser Ala Leu Arg<sub>640</sub>

Gly Asn Phe Lys Gln<sub>645</sub> Ala Phe Ala Thr Ala<sub>650</sub> Gly Val Ala Phe Leu<sub>655</sub> Leu

Glu Gly Phe Pro<sub>660</sub> Glu Phe Thr Ile Pro<sub>665</sub> Ala Leu Gly Val Phe<sub>670</sub> Thr Phe

Tyr Ser Ser<sub>675</sub> Ile Gln Glu Arg Glu<sub>680</sub> Lys Ile Ile Lys Thr<sub>685</sub> Ile Glu Asn

Cys Leu<sub>690</sub> Glu Gln Arg Val Lys<sub>695</sub> Arg Trp Lys Asp Ser<sub>700</sub> Tyr Gln Trp Met

Val Ser Asn Trp Leu Ser<sub>710</sub> Arg Ile Thr Thr Arg<sub>715</sub> Phe Asn His Ile Ser<sub>720</sub>

Tyr Gln Met Tyr Asp<sub>725</sub> Ser Leu Ser Tyr Gln<sub>730</sub> Ala Asp Ala Ile Lys<sub>735</sub> Ala

Lys Ile Asp Leu<sub>740</sub> Glu Tyr Lys Lys Tyr<sub>745</sub> Ser Gly Ser Asp Lys<sub>750</sub> Glu Asn

Ile Lys Ser<sub>755</sub> Gln Val Glu Asn Leu<sub>760</sub> Lys Asn Ser Leu Asp<sub>765</sub> Val Lys Ile

Ser Glu Ala Met Asn Asn Ile<sub>775</sub> Asn Lys Phe Ile Arg<sub>780</sub> Glu Cys Ser Val

Thr Tyr Leu Phe Lys Asn<sub>790</sub> Met Leu Pro Lys Val<sub>795</sub> Ile Asp Glu Leu Asn<sub>800</sub>

Lys Phe Asp Leu Lys<sub>805</sub> Thr Lys Thr Glu Leu<sub>810</sub> Ile Asn Leu Ile Asp<sub>815</sub> Ser

His Asn Ile Ile<sub>820</sub> Leu Val Gly Glu Val<sub>825</sub> Asp Arg Leu Lys Ala<sub>830</sub> Lys Val

Asn Glu Ser<sub>835</sub> Phe Glu Asn Thr Ile<sub>840</sub> Pro Phe Asn Ile Phe<sub>845</sub> Ser Tyr Thr

Asn Asn Ser Leu Leu Lys Asp Met Ile Asn Glu Tyr Phe Asn Ser Ile  
Seite 21

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  
 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

Asp Asp Tyr Trp Phe Asn His Glu Tyr Leu Ile Pro Val Ile Lys  
1250 1255 1260

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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<400> 21

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  
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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  
Seite 24





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

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  
 900 905 910  
 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  
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 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  
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 Thr Arg Tyr Ile Gly Ile Arg Tyr Phe Asn Ile Phe Asp Lys Glu  
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 1055 1060 1065  
 Thr Asn Ile Leu Lys Asp Phe Trp Gly Asn Tyr Leu Leu Tyr Asp  
 1070 1075 1080  
 Lys Glu Tyr Tyr Leu Leu Asn Val Leu Lys Pro Asn Asn Phe Ile  
 1085 1090 1095  
 Asp Arg Arg Lys Asp Ser Thr Leu Ser Ile Asn Asn Ile Arg Ser  
 1100 1105 1110  
 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  
 1130 1135 1140  
 Lys Asn Asp Gln Val Tyr Ile Asn Phe Val Ala Ser Lys Thr His  
 1145 1150 1155

Leu Phe Pro Leu Tyr Ala Asp Thr Ala Thr Thr Asn Lys Glu Lys  
1160 1165 1170

Thr Ile Lys Ile Ser Ser Ser Gly Asn Arg Phe Asn Gln Val Val  
1175 1180 1185

Val Met Asn Ser Val Gly Asn Cys Thr Met Asn Phe Lys Asn Asn  
1190 1195 1200

Asn Gly Asn Asn Ile Gly Leu Leu Gly Phe Lys Ala Asp Thr Val  
1205 1210 1215

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

Arg Asp Thr Ile Gly Thr Lys Pro Asp Glu Phe Gln Val Pro Asp Ser  
50 55 60

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

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  
115 120 125

Leu Pro Val Asn Val Thr Thr Ser Val Asn Ile Lys Phe Ser Thr Asp  
130 135 140

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  
 165 170 175  
 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  
 210 215 220  
 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  
 Asn Thr Ala Pro Pro Gly Tyr Asp Ile Asn Glu Tyr Lys Asp Tyr Phe  
 305 310 315 320  
 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  
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Gln Lys Val Pro Glu Gly Glu Thr Asn Ile Ser Leu Thr Ser Ser Ile  
 545 550 555 560

Asp Thr Ala Leu Leu Glu Glu Ser Lys Val Tyr Thr Phe Phe Ser Ser  
 565 570 575

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  
 625 630 635 640

Glu Glu Ala Phe Glu Leu Leu Gly Ala Gly Ile Leu Leu Glu Phe Val  
 645 650 655

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  
 675 680 685

Ser Leu Ile Glu Arg Glu Ala Lys Trp Lys Glu Ile Tyr Ser Trp Ile  
690 695 700

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  
755 760 765

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  
785 790 795 800

Leu Lys Glu Tyr Asp Lys His Val Lys Ser Asp Leu Leu Asp Tyr Ile  
805 810 815

Leu Tyr His Lys Leu Ile Leu Gly Glu Gln Thr Lys Glu Leu Ile Asp  
820 825 830

Leu Val Thr Ser Thr Leu Asn Ser Ser Ile Pro Phe Glu Leu Ser Ser  
835 840 845

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  
865 870 875 880

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  
945 950 955 960

Met Gly Asn Asn Asn Ser Gly Trp Lys Ile Ser Leu Arg Thr Ile Arg





Asp Gly Ser Asn Ile Gly Leu Leu Gly Phe His Ser Asp Asp Leu  
1235 1240 1245

Val Ala Ser Ser Trp Tyr Tyr Asn His Ile Arg Arg Asn Thr Ser  
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Ser Asn Gly Cys Phe Trp Ser Phe Ile Ser Lys Glu His Gly Trp  
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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  
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Arg Phe Thr Tyr Gly Phe Gln Pro Asp Gln Phe Asn Ala Ser Thr Gly  
50 55 60

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  
85 90 95

Asn Arg Ile Asn Ser Lys Pro Ser Gly Gln Arg Leu Leu Asp Met Ile  
100 105 110

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

Phe Ala Ala Asn Val Ala Asn Val Ser Ile Asn Lys Lys Ile Ile Gln  
130 135 140

Pro Gly Ala Glu Asp Gln Ile Lys Gly Leu Met Thr Asn Leu Ile Ile  
145 150 155 160

Phe Gly Pro Gly Pro Val Leu Ser Asp Asn Phe Thr Asp Ser Met Ile  
165 170 175  
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  
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  
 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

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  
Seite 36

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	
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Ile	Tyr	Ile	Asn	Gly	Ser	Leu	Lys	Lys	Ser	Glu	Lys	Ile	Leu	Asn	
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Leu	Asp	Arg	Ile	Asn	Ser	Ser	Asn	Asp	Ile	Asp	Phe	Lys	Leu	Ile	
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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	
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Trp	Ile	Gln	Ser	Ser	Thr	Asn	Thr	Leu	Lys	Asp	Phe	Trp	Gly	Asn	
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Pro	Leu	Arg	Tyr	Asp	Thr	Gln	Tyr	Tyr	Leu	Phe	Asn	Gln	Gly	Met	
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Gln	Asn	Ile	Tyr	Ile	Lys	Tyr	Phe	Ser	Lys	Ala	Ser	Met	Gly	Glu	
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Thr	Ala	Pro	Arg	Thr	Asn	Phe	Asn	Asn	Ala	Ala	Ile	Asn	Tyr	Gln	
	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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<213> Clostridium tetani

<400> 24

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Asp Thr Ile Ile Met Met Glu Pro Pro Tyr Cys Lys Gly Leu Asp Ile  
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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

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

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  
seite 39

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  
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 Thr Thr Pro Val Thr Lys Gly Ile Pro Tyr Ala Pro Glu Tyr Lys Ser  
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 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  
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 Thr Met Thr Asn Ser Val Asp Asp Ala Leu Ile Asn Ser Thr Lys Ile  
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 Tyr Ser Tyr Phe Pro Ser Val Ile Ser Lys Val Asn Gln Gly Ala Gln  
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 Gly Ile Leu Phe Leu Gln Trp Val Arg Asp Ile Ile Asp Asp Phe Thr  
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 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  
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 Tyr Glu Gly Asn Phe Ile Gly Ala Leu Glu Thr Thr Gly Val Val Leu  
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 Leu Leu Glu Tyr Ile Pro Glu Ile Thr Leu Pro Val Ile Ala Ala Leu  
                                  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  
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 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 1010	Val	Arg	Gln	Ile	Thr 1015	Phe	Arg	Asp	Leu	Pro 1020	Asp	Lys	Phe
Asn	Ala 1025	Tyr	Leu	Ala	Asn	Lys 1030	Trp	Val	Phe	Ile	Thr 1035	Ile	Thr	Asn
Asp	Arg 1040	Leu	Ser	Ser	Ala	Asn 1045	Leu	Tyr	Ile	Asn	Gly 1050	Val	Leu	Met
Gly	Ser 1055	Ala	Glu	Ile	Thr	Gly 1060	Leu	Gly	Ala	Ile	Arg 1065	Glu	Asp	Asn
Asn	Ile 1070	Thr	Leu	Lys	Leu	Asp 1075	Arg	Cys	Asn	Asn	Asn 1080	Asn	Gln	Tyr
Val	Ser 1085	Ile	Asp	Lys	Phe	Arg 1090	Ile	Phe	Cys	Lys	Ala 1095	Leu	Asn	Pro
Lys	Glu 1100	Ile	Glu	Lys	Leu	Tyr 1105	Thr	Ser	Tyr	Leu	Ser 1110	Ile	Thr	Phe
Leu	Arg 1115	Asp	Phe	Trp	Gly	Asn 1120	Pro	Leu	Arg	Tyr	Asp 1125	Thr	Glu	Tyr
Tyr	Leu 1130	Ile	Pro	Val	Ala	Ser 1135	Ser	Ser	Lys	Asp	Val 1140	Gln	Leu	Lys
Asn	Ile 1145	Thr	Asp	Tyr	Met	Tyr 1150	Leu	Thr	Asn	Ala	Pro 1155	Ser	Tyr	Thr
Asn	Gly 1160	Lys	Leu	Asn	Ile	Tyr 1165	Tyr	Arg	Arg	Leu	Tyr 1170	Asn	Gly	Leu
Lys	Phe 1175	Ile	Ile	Lys	Arg	Tyr 1180	Thr	Pro	Asn	Asn	Glu 1185	Ile	Asp	Ser
Phe	Val 1190	Lys	Ser	Gly	Asp	Phe 1195	Ile	Lys	Leu	Tyr	Val 1200	Ser	Tyr	Asn
Asn	Asn 1205	Glu	His	Ile	Val	Gly 1210	Tyr	Pro	Lys	Asp	Gly 1215	Asn	Ala	Phe
Asn	Asn 1220	Leu	Asp	Arg	Ile	Leu 1225	Arg	Val	Gly	Tyr	Asn 1230	Ala	Pro	Gly
Ile	Pro 1235	Leu	Tyr	Lys	Lys	Met 1240	Glu	Ala	Val	Lys	Leu 1245	Arg	Asp	Leu
Lys	Thr 1250	Tyr	Ser	Val	Gln	Leu 1255	Lys	Leu	Tyr	Asp	Asp 1260	Lys	Asn	Ala

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  
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Leu Lys Asp Lys Ile Leu Gly Cys Asp Trp Tyr Phe Val Pro Thr  
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Asp Glu Gly Trp Thr Asn Asp  
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Asn Ile Ser Leu Asp Leu Cys  
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<212> PRT  
<213> artificial sequence

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<223> Tripeptide for affinity purification 3

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