

SEQUENCE LISTING

<110> NOVARTIS AG

<120> PURIFICATION OF STAPHYLOCOCCUS AUREUS TYPE 5 AND TYPE 8
CAPSULAR SACCHARIDES

<130> P055840WO

<140> PCT/IB2010/_____
<141> 2010-11-01<150> US-61/256,905
<151> 2009-10-30

<160> 54

<170> Seqwin2010, version 1.0

<210> 1
<211> 927
<212> PRT
<213> Staphylococcus aureus

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 35 40 45
 Ser Ala Ser Asn Glu Ser Lys Ser Asn Asp Ser Ser Ser Val Ser Ala
 50 55 60
 Ala Pro Lys Thr Asp Asp Thr Asn Val Ser Asp Thr Lys Thr Ser Ser
 65 70 75 80
 Asn Thr Asn Asn Gly Glu Thr Ser Val Ala Gln Asn Pro Ala Gln Gln
 85 90 95
 Glu Thr Thr Gln Ser Ser Ser Thr Asn Ala Thr Thr Glu Glu Thr Pro
 100 105 110
 Val Thr Gly Glu Ala Thr Thr Thr Thr Thr Asn Gln Ala Asn Thr Pro
 115 120 125
 Ala Thr Thr Gln Ser Ser Asn Thr Asn Ala Glu Glu Leu Val Asn Gln
 130 135 140
 Thr Ser Asn Glu Thr Thr Ser Asn Asp Thr Asn Thr Val Ser Ser Val
 145 150 155 160
 Asn Ser Pro Gln Asn Ser Thr Asn Ala Glu Asn Val Ser Thr Thr Gln
 165 170 175
 Asp Thr Ser Thr Glu Ala Thr Pro Ser Asn Asn Glu Ser Ala Pro Gln
 180 185 190
 Ser Thr Asp Ala Ser Asn Lys Asp Val Val Asn Gln Ala Val Asn Thr
 195 200 205
 Ser Ala Pro Arg Met Arg Ala Phe Ser Leu Ala Ala Val Ala Ala Asp
 210 215 220
 Ala Pro Val Ala Gly Thr Asp Ile Thr Asn Gln Leu Thr Asn Val Thr

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225		230		235		240
Val Gly Ile Asp	Ser 245	Gly Thr Thr Val	Tyr 250	Pro His Gln Ala	Gly 255	Tyr
Val Lys Leu Asn	Tyr 260	Gly Phe Ser Val	Pro Asn Ser Ala	Val 270	Lys Gly	
Asp Thr Phe 275	Lys Ile Thr Val	Pro 280	Lys Glu Leu Asn	Leu 285	Gly Val	
Thr Ser 290	Thr Ala Lys Val	Pro 295	Pro Ile Met Ala	Gly 300	Asp Gln Val	Leu
Ala 305	Asn Gly Val Ile	Asp 310	Ser Asp Gly Asn	Val 315	Ile Tyr Thr Phe	Thr 320
Asp Tyr Val Asn	Thr 325	Lys Asp Asp Val	Lys 330	Ala Thr Leu Thr	Met 335	Pro
Ala Tyr Ile Asp	Pro 340	Glu Asn Val	Lys 345	Lys Thr Gly Asn	Val 350	Thr Leu
Ala Thr Gly 355	Ile Gly Ser Thr	Thr 360	Ala Asn Lys Thr	Val 365	Leu Val Asp	
Tyr Glu 370	Lys Tyr Gly Lys	Phe 375	Tyr Asn Leu Ser	Ile 380	Lys Gly Thr Ile	
Asp 385	Gln Ile Asp Lys	Thr 390	Asn Asn Thr Tyr	Arg 395	Gln Thr Ile Tyr	Val 400
Asn Pro Ser Gly	Asp 405	Asn Val Ile Ala	Pro 410	Val Leu Thr Gly	Asn 415	Leu
Lys Pro Asn Thr	420	Asp Ser Asn Ala	Leu 425	Ile Asp Gln Gln	Asn 430	Thr Ser
Ile Lys Val 435	Tyr Lys Val Asp	Asn 440	Ala Ala Asp Leu	Ser 445	Glu Ser Tyr	
Phe Val 450	Asn Pro Glu Asn	Phe 455	Glu Asp Val Thr	Asn 460	Ser Val Asn Ile	
Thr Phe Pro Asn	Pro 470	Asn Gln Tyr Lys	Val 475	Glu Phe Asn Thr	Pro 480	Asp
Asp Gln Ile Thr	485	Pro Tyr Ile Val	Val 490	Val Asn Gly His	Ile 495	Asp
Pro Asn Ser Lys	500	Gly Asp Leu Ala	Leu 505	Arg Ser Thr Leu	Tyr 510	Gly Tyr
Asn Ser Asn Ile	Ile 515	Trp Arg Ser	Met 520	Ser Trp Asp	Asn 525	Glu Val Ala
Phe Asn Asn Gly	Ser 530	Gly Ser Gly Ser	535	Gly Asp Gly Ile	Asp 540	Lys Pro Val Val
Pro Glu Gln Pro	Asp 545	Glu Pro Gly Glu	Ile 550	Glu 555	Pro Ile Pro Glu	Asp 560
Ser Asp Ser Asp	Pro 565	Gly Ser Asp Ser	Gly 570	Ser Asp Ser Asn	Ser 575	Asp
Ser Gly Ser Asp	580	Ser Gly Ser Asp	Ser 585	Thr Ser Asp Ser	Gly 590	Ser Asp

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Ser Ala Ser Asp Ser Asp Ser Ala Ser Asp Ser Asp Ser Ala Ser Asp
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Ser Asp Ser Ala Ser Asp Ser Asp Ser Ala Ser Asp Ser Asp Ser Asp
610 615 620

Asn Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
625 630 635 640

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
645 650 655

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
660 665 670

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
675 680 685

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690 695 700

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725 730 735

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740 745 750

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Ala
755 760 765

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
770 775 780

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785 790 795 800

Ser Asp Ser Asp Ser Asp Ser Glu Ser Asp Ser Asp Ser Asp Ser Asp
805 810 815

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Ala
820 825 830

Ser Asp Ser Asp Ser Gly Ser Asp Ser Asp Ser Ser Ser Asp Ser Asp
835 840 845

Ser Glu Ser Asp Ser Asn Ser Asp Ser Glu Ser Val Ser Asn Asn Asn
850 855 860

Val Val Pro Pro Asn Ser Pro Lys Asn Gly Thr Asn Ala Ser Asn Lys
865 870 875 880

Asn Glu Ala Lys Asp Ser Lys Glu Pro Leu Pro Asp Thr Gly Ser Glu
885 890 895

Asp Glu Ala Asn Thr Ser Leu Ile Trp Gly Leu Leu Ala Ser Ile Gly
900 905 910

Ser Leu Leu Leu Phe Arg Arg Lys Lys Glu Asn Lys Asp Lys Lys
915 920 925

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<211>

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<212>

PRT

<213>

Staphylococcus aureus

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

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355 360 365
 Ile Ala Pro Val Leu Thr Gly Asn Leu Lys Pro Asn Thr Asp Ser Asn
 370 375 380
 Ala Leu Ile Asp Gln Gln Asn Thr Ser Ile Lys Val Tyr Lys Val Asp
 385 390 395 400
 Asn Ala Ala Asp Leu Ser Glu Ser Tyr Phe Val Asn Pro Glu Asn Phe
 405 410 415
 Glu Asp Val Thr Asn Ser Val Asn Ile Thr Phe Pro Asn Pro Asn Gln
 420 425 430
 Tyr Lys Val Glu Phe Asn Thr Pro Asp Asp Gln Ile Thr Thr Pro Tyr
 435 440 445
 Ile Val Val Val Asn Gly His Ile Asp Pro Asn Ser Lys Gly Asp Leu
 450 455 460
 Ala Leu Arg Ser Thr Leu Tyr Gly Tyr Asn Ser Asn Ile Ile Trp Arg
 465 470 475 480
 Ser Met Ser Trp Asp Asn Glu Val Ala Phe Asn Asn Gly Ser Gly Ser
 485 490 495
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 Gly Glu Ile Glu Pro Ile Pro Glu
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 <212> PRT
 <213> Staphylococcus aureus
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 Ile Leu Phe Gly Ile Gly Asn His Gln Ala Gln Ala Ser Glu Gln Ser
 35 40 45
 Asn Asp Thr Thr Gln Ser Ser Lys Asn Asn Ala Ser Ala Asp Ser Glu
 50 55 60
 Lys Asn Asn Met Ile Glu Thr Pro Gln Leu Asn Thr Thr Ala Asn Asp
 65 70 75 80
 Thr Ser Asp Ile Ser Ala Asn Thr Asn Ser Ala Asn Val Asp Ser Thr
 85 90 95
 Thr Lys Pro Met Ser Thr Gln Thr Ser Asn Thr Thr Thr Thr Glu Pro
 100 105 110
 Ala Ser Thr Asn Glu Thr Pro Gln Pro Thr Ala Ile Lys Asn Gln Ala
 115 120 125
 Thr Ala Ala Lys Met Gln Asp Gln Thr Val Pro Gln Glu Ala Asn Ser
 130 135 140
 Gln Val Asp Asn Lys Thr Asn Asp Ala Asn Ser Ile Ala Thr Asn
 145 150 155 160

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

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Arg Tyr Gly Gly Gly Ser Ala Asp Gly Asp Ser Ala Val Asn Pro Lys
 530 535 540
 Asp Pro Thr Pro Gly Pro Pro Val Asp Pro Glu Pro Ser Pro Asp Pro
 545 550 555 560
 Glu Pro Glu Pro Thr Pro Asp Pro Glu Pro Ser Pro Asp Pro Glu Pro
 565 570 575
 Glu Pro Ser Pro Asp Pro Asp Pro Asp Ser Asp Ser Asp Ser Asp Ser
 580 585 590
 Gly Ser Asp Ser Asp Ser Gly Ser Asp Ser Asp Ser Glu Ser Asp Ser
 595 600 605
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Glu Ser
 610 615 620
 Asp Ser Asp Ser Glu Ser Asp Ser Glu Ser Asp Ser Asp Ser Asp Ser
 625 630 635 640
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 645 650 655
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 660 665 670
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 675 680 685
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 690 695 700
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 705 710 715 720
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 725 730 735
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 740 745 750
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 755 760 765
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 770 775 780
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 785 790 795 800
 Asp Ser Asp Ser Arg Val Thr Pro Pro Asn Asn Glu Gln Lys Ala Pro
 805 810 815
 Ser Asn Pro Lys Gly Glu Val Asn His Ser Asn Lys Val Ser Lys Gln
 820 825 830
 His Lys Thr Asp Ala Leu Pro Glu Thr Gly Asp Lys Ser Glu Asn Thr
 835 840 845
 Asn Ala Thr Leu Phe Gly Ala Met Met Ala Leu Leu Gly Ser Leu Leu
 850 855 860
 Leu Phe Arg Lys Arg Lys Gln Asp His Lys Glu Lys Ala
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<210> 4

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<211> 508

<212> PRT

<213> Staphylococcus aureus

<400> 4

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

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Val Asp Thr Ala Ser Gly Gln Asn Thr Tyr Lys Gln Thr Val Phe Val
 340 345 350
 Asn Pro Lys Gln Arg Val Leu Gly Asn Thr Trp Val Tyr Ile Lys Gly
 355 360 365
 Tyr Gln Asp Lys Ile Glu Glu Ser Ser Gly Lys Val Ser Ala Thr Asp
 370 375 380
 Thr Lys Leu Arg Ile Phe Glu Val Asn Asp Thr Ser Lys Leu Ser Asp
 385 390 395 400
 Ser Tyr Tyr Ala Asp Pro Asn Asp Ser Asn Leu Lys Glu Val Thr Asp
 405 410 415
 Gln Phe Lys Asn Arg Ile Tyr Tyr Glu His Pro Asn Val Ala Ser Ile
 420 425 430
 Lys Phe Gly Asp Ile Thr Lys Thr Tyr Val Val Leu Val Glu Gly His
 435 440 445
 Tyr Asp Asn Thr Gly Lys Asn Leu Lys Thr Gln Val Ile Gln Glu Asn
 450 455 460
 Val Asp Pro Val Thr Asn Arg Asp Tyr Ser Ile Phe Gly Trp Asn Asn
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 Glu Asn Val Val Arg Tyr Gly Gly Gly Ser Ala Asp Gly Asp Ser Ala
 485 490 495
 Val Asn Pro Lys Asp Pro Thr Pro Gly Pro Pro Val
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<210> 5
 <211> 316
 <212> PRT
 <213> Staphylococcus aureus

<400> 5
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 Thr Ala Asn Asp Thr Ser Asp Ile Ser Ala Asn Thr Asn Ser Ala Asn
 35 40 45
 Val Asp Ser Thr Thr Lys Pro Met Ser Thr Gln Thr Ser Asn Thr Thr
 50 55 60
 Thr Thr Glu Pro Ala Ser Thr Asn Glu Thr Pro Gln Pro Thr Ala Ile
 65 70 75 80
 Lys Asn Gln Ala Thr Ala Ala Lys Met Gln Asp Gln Thr Val Pro Gln
 85 90 95
 Glu Ala Asn Ser Gln Val Asp Asn Lys Thr Thr Asn Asp Ala Asn Ser
 100 105 110
 Ile Ala Thr Asn Ser Glu Leu Lys Asn Ser Gln Thr Leu Asp Leu Pro
 115 120 125
 Gln Ser Ser Pro Gln Thr Ile Ser Asn Ala Gln Gly Thr Ser Lys Pro
 130 135 140
 Ser Val Arg Thr Arg Ala Val Arg Ser Leu Ala Val Ala Glu Pro Val
 145 150 155 160

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Val Asn Ala Ala Asp 165 Ala Lys Gly Thr Asn 170 Val Asn Asp Lys 175 Thr
 Ala Ser Asn Phe 180 Lys Leu Glu Lys Thr 185 Thr Phe Asp Pro Asn 190 Gln Ser
 Gly Asn Thr 195 Phe Met Ala Ala Asn 200 Phe Thr Val Thr Asp 205 Lys Val Lys
 Ser Gly 210 Asp Tyr Phe Thr Ala 215 Lys Leu Pro Asp Ser 220 Leu Thr Gly Asn
 Gly 225 Asp Val Asp Tyr Ser 230 Asn Ser Asn Asn Thr 235 Met Pro Ile Ala Asp 240
 Ile Lys Ser Thr Asn 245 Gly Asp Val Val Ala 250 Lys Ala Thr Tyr Asp 255 Ile
 Leu Thr Lys Thr 260 Tyr Thr Phe Val Phe 265 Thr Asp Tyr Val Asn 270 Asn Lys
 Glu Asn Ile 275 Asn Gly Gln Phe Ser 280 Leu Pro Leu Phe Thr 285 Asp Arg Ala
 Lys Ala 290 Pro Lys Ser Gly Thr 295 Tyr Asp Ala Asn Ile 300 Asn Ile Ala Asp
 Glu Met 305 Phe Asn Asn Lys 310 Ile Thr Tyr Asn Tyr 315 Ser

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 <212> PRT
 <213> Staphylococcus aureus

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 35 45
 Lys Leu Pro Asp Ser Leu Thr 55 Gly Asn Gly Asp Val 60 Asp Tyr Ser Asn
 50 60
 Ser Asn Asn Thr Met 70 Pro Ile Ala Asp Ile Lys 75 Ser Thr Asn Gly Asp
 65 80
 Val Val Ala Lys 85 Ala Thr Tyr Asp Ile Leu Thr Lys Thr Tyr Thr Phe
 90 95
 Val Phe Thr Asp 100 Tyr Val Asn Asn Lys 105 Glu Asn Ile Asn Gly Gln Phe
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 Ser Leu Pro 115 Leu Phe Thr Asp Arg Ala Lys Ala Pro Lys 125 Ser Gly Thr
 120
 Tyr Asp Ala Asn Ile Asn 135 Ile Ala Asp Glu Met Phe 140 Asn Asn Lys Ile
 130
 Thr Tyr Asn Tyr Ser 150 Ser Pro Ile Ala Gly Ile 155 Asp Lys Pro Asn Gly
 145 160
 Ala Asn Ile Ser Ser Gln Ile Ile Gly Val Asp Thr Ala Ser Gly Gln

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165 170 175
 Asn Thr Tyr Lys Gln Thr Val Phe Val Asn Pro Lys Gln Arg Val Leu
 180 185 190
 Gly Asn Thr Trp Val Tyr Ile Lys Gly Tyr Gln Asp Lys Ile Glu Glu
 195 200 205
 Ser Ser Gly Lys Val Ser Ala Thr Asp Thr Lys Leu Arg Ile Phe Glu
 210 215 220
 Val Asn Asp Thr Ser Lys Leu Ser Asp Ser Tyr Tyr Ala Asp Pro Asn
 225 230 235 240
 Asp Ser Asn Leu Lys Glu Val Thr Asp Gln Phe Lys Asn Arg Ile Tyr
 245 250 255
 Tyr Glu His Pro Asn Val Ala Ser Ile Lys Phe Gly Asp Ile Thr Lys
 260 265 270
 Thr Tyr Val Val Leu Val Glu Gly His Tyr Asp Asn Thr Gly Lys Asn
 275 280 285
 Leu Lys Thr Gln Val Ile Gln Glu Asn Val Asp Pro Val Thr Asn Arg
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 Gly Gly Ser Ala Asp Gly Asp Ser Ala Val Asn
 325 330

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 <211> 183
 <212> PRT
 <213> Staphylococcus aureus

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 35 40 45
 Val Tyr Ile Lys Gly Tyr Gln Asp Lys Ile Glu Glu Ser Ser Gly Lys
 50 55 60
 Val Ser Ala Thr Asp Thr Lys Leu Arg Ile Phe Glu Val Asn Asp Thr
 65 70 75 80
 Ser Lys Leu Ser Asp Ser Tyr Tyr Ala Asp Pro Asn Asp Ser Asn Leu
 85 90 95
 Lys Glu Val Thr Asp Gln Phe Lys Asn Arg Ile Tyr Tyr Glu His Pro
 100 105 110
 Asn Val Ala Ser Ile Lys Phe Gly Asp Ile Thr Lys Thr Tyr Val Val
 115 120 125
 Leu Val Glu Gly His Tyr Asp Asn Thr Gly Lys Asn Leu Lys Thr Gln
 130 135 140
 Val Ile Gln Glu Asn Val Asp Pro Val Thr Asn Arg Asp Tyr Ser Ile
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Phe Gly Trp Asn Asn Glu Asn Val Val Arg Tyr Gly Gly Gly Ser Ala
 165 170 175

Asp Gly Asp Ser Ala Val Asn
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<210> 8
 <211> 1166
 <212> PRT
 <213> Staphylococcus aureus

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Ala Ser Ile Leu Val Gly Thr Thr Leu Ile Phe Gly Leu Gly Asn Gln
 35 40 45

Glu Ala Lys Ala Ala Glu Asn Thr Ser Thr Glu Asn Ala Lys Gln Asp
 50 55 60

Asp Ala Thr Thr Ser Asp Asn Lys Glu Val Val Ser Glu Thr Glu Asn
 65 70 75 80

Asn Ser Thr Thr Glu Asn Asn Ser Thr Asn Pro Ile Lys Lys Glu Thr
 85 90 95

Asn Thr Asp Ser Gln Pro Glu Ala Lys Lys Glu Ser Thr Ser Ser
 100 105 110

Thr Gln Lys Gln Gln Asn Asn Val Thr Ala Thr Thr Glu Thr Lys Pro
 115 120 125

Gln Asn Ile Glu Lys Glu Asn Val Lys Pro Ser Thr Asp Lys Thr Ala
 130 135 140

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

Thr Asn Asn Asp Val Thr Thr Lys Pro Ser Thr Ser Glu Pro Ser Thr
 165 170 175

Ser Glu Ile Gln Thr Lys Pro Thr Thr Pro Gln Glu Ser Thr Asn Ile
 180 185 190

Glu Asn Ser Gln Pro Gln Pro Thr Pro Ser Lys Val Asp Asn Gln Val
 195 200 205

Thr Asp Ala Thr Asn Pro Lys Glu Pro Val Asn Val Ser Lys Glu Glu
 210 215 220

Leu Lys Asn Asn Pro Glu Lys Leu Lys Glu Leu Val Arg Asn Asp Ser
 225 230 235 240

Asn Thr Asp His Ser Thr Lys Pro Val Ala Thr Ala Pro Thr Ser Val
 245 250 255

Ala Pro Lys Arg Val Asn Ala Lys Met Arg Phe Ala Val Ala Gln Pro
 260 265 270

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

Gln Thr Ile Lys Val Gly Asp Gly Lys Asp Asn Val Ala Ala Ala His
 290 295 300

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Asp Gly Lys Asp Ile Glu Tyr Asp Thr Glu Phe Thr Ile Asp Asn Lys
 305 310 315 320
 Val Lys Lys Gly Asp Thr Met Thr Ile Asn Tyr Asp Lys Asn Val Ile
 325 330 335
 Pro Ser Asp Leu Thr Asp Lys Asn Asp Pro Ile Asp Ile Thr Asp Pro
 340 345 350
 Ser Gly Glu Val Ile Ala Lys Gly Thr Phe Asp Lys Ala Thr Lys Gln
 355 360 365
 Ile Thr Tyr Thr Phe Thr Asp Tyr Val Asp Lys Tyr Glu Asp Ile Lys
 370 375 380
 Ser Arg Leu Thr Leu Tyr Ser Tyr Ile Asp Lys Lys Thr Val Pro Asn
 385 390 395 400
 Glu Thr Ser Leu Asn Leu Thr Phe Ala Thr Ala Gly Lys Glu Thr Ser
 405 410 415
 Gln Asn Val Thr Val Asp Tyr Gln Asp Pro Met Val His Gly Asp Ser
 420 425 430
 Asn Ile Gln Ser Ile Phe Thr Lys Leu Asp Glu Asp Lys Gln Thr Ile
 435 440 445
 Glu Gln Gln Ile Tyr Val Asn Pro Leu Lys Lys Ser Ala Thr Asn Thr
 450 455 460
 Lys Val Asp Ile Ala Gly Ser Gln Val Asp Asp Tyr Gly Asn Ile Lys
 465 470 475 480
 Leu Gly Asn Gly Ser Thr Ile Ile Asp Gln Asn Thr Glu Ile Lys Val
 485 490 495
 Tyr Lys Val Asn Ser Asp Gln Gln Leu Pro Gln Ser Asn Arg Ile Tyr
 500 505 510
 Asp Phe Ser Gln Tyr Glu Asp Val Thr Ser Gln Phe Asp Asn Lys Lys
 515 520 525
 Ser Phe Ser Asn Asn Val Ala Thr Leu Asp Phe Gly Asp Ile Asn Ser
 530 535 540
 Ala Tyr Ile Ile Lys Val Val Ser Lys Tyr Thr Pro Thr Ser Asp Gly
 545 550 555 560
 Glu Leu Asp Ile Ala Gln Gly Thr Ser Met Arg Thr Thr Asp Lys Tyr
 565 570 575
 Gly Tyr Tyr Asn Tyr Ala Gly Tyr Ser Asn Phe Ile Val Thr Ser Asn
 580 585 590
 Asp Thr Gly Gly Gly Asp Gly Thr Val Lys Pro Glu Glu Lys Leu Tyr
 595 600 605
 Lys Ile Gly Asp Tyr Val Trp Glu Asp Val Asp Lys Asp Gly Val Gln
 610 615 620
 Gly Thr Asp Ser Lys Glu Lys Pro Met Ala Asn Val Leu Val Thr Leu
 625 630 635 640
 Thr Tyr Pro Asp Gly Thr Thr Lys Ser Val Arg Thr Asp Ala Asn Gly
 645 650 655
 His Tyr Glu Phe Gly Gly Leu Lys Asp Gly Glu Thr Tyr Thr Val Lys

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660		665		670
Phe Glu Thr Pro Thr Gly Tyr Leu Pro Thr Lys Val Asn Gly Thr Thr	675	680		685
Asp Gly Glu Lys Asp Ser Asn Gly Ser Ser Val Thr Val Lys Ile Asn	690	695		700
Gly Lys Asp Asp Met Ser Leu Asp Thr Gly Phe Tyr Lys Glu Pro Lys	705	710		715
Tyr Asn Leu Gly Asp Tyr Val Trp Glu Asp Thr Asn Lys Asp Gly Ile	725	730		735
Gln Asp Ala Asn Glu Pro Gly Ile Lys Asp Val Lys Val Thr Leu Lys	740	745		750
Asp Ser Thr Gly Lys Val Ile Gly Thr Thr Thr Thr Asp Ala Ser Gly	755	760		765
Lys Tyr Lys Phe Thr Asp Leu Asp Asn Gly Asn Tyr Thr Val Glu Phe	770	775		780
Glu Thr Pro Ala Gly Tyr Thr Pro Thr Val Lys Asn Thr Thr Ala Asp	785	790		795
Asp Lys Asp Ser Asn Gly Leu Thr Thr Thr Gly Val Ile Lys Asp Ala	805	810		815
Asp Asn Met Thr Leu Asp Arg Gly Phe Tyr Lys Thr Pro Lys Tyr Ser	820	825		830
Leu Gly Asp Tyr Val Trp Tyr Asp Ser Asn Lys Asp Gly Lys Gln Asp	835	840		845
Ser Thr Glu Lys Gly Ile Lys Asp Val Thr Val Thr Leu Gln Asn Glu	850	855		860
Lys Gly Glu Val Ile Gly Thr Thr Lys Thr Asp Glu Asn Gly Lys Tyr	865	870		875
Arg Phe Asp Asn Leu Asp Ser Gly Lys Tyr Lys Val Ile Phe Glu Lys	885	890		895
Pro Ala Gly Leu Thr Gln Thr Val Thr Asn Thr Thr Glu Asp Asp Lys	900	905		910
Asp Ala Asp Gly Gly Glu Val Asp Val Thr Ile Thr Asp His Asp Asp	915	920		925
Phe Thr Leu Asp Asn Gly Tyr Phe Glu Glu Asp Thr Ser Asp Ser Asp	930	935		940
Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp	945	950		955
Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp	965	970		975
Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp	980	985		990
Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp	995	1000		1005
Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp	1010	1015		1020

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Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
1025 1030 1035 1040

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
1045 1050 1055

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
1060 1065 1070

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
1075 1080 1085

Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp
1090 1095 1100

Ser Asp Ala Gly Lys His Thr Pro Val Lys Pro Met Ser Thr Thr Lys
1105 1110 1115 1120

Asp His His Asn Lys Ala Lys Ala Leu Pro Glu Thr Gly Ser Glu Asn
1125 1130 1135

Asn Gly Ser Asn Asn Ala Thr Leu Phe Gly Gly Leu Phe Ala Ala Leu
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Gly Ser Leu Leu Leu Phe Gly Arg Arg Lys Lys Gln Asn Lys
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<211> 580

<212> PRT

<213> Staphylococcus aureus

<400> 9

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Glu Asn Asn Ser Thr Asn Pro Ile Lys Lys Glu Thr Asn Thr Asp Ser
35 40 45

Gln Pro Glu Ala Lys Lys Glu Ser Thr Ser Ser Ser Thr Gln Lys Gln
50 55 60

Gln Asn Asn Val Thr Ala Thr Thr Glu Thr Lys Pro Gln Asn Ile Glu
65 70 75 80

Lys Glu Asn Val Lys Pro Ser Thr Asp Lys Thr Ala Thr Glu Asp Thr
85 90 95

Ser Val Ile Leu Glu Glu Lys Lys Ala Pro Asn Asn Thr Asn Asn Asp
100 105 110

Val Thr Thr Lys Pro Ser Thr Ser Glu Pro Ser Thr Ser Glu Ile Gln
115 120 125

Thr Lys Pro Thr Thr Pro Gln Glu Ser Thr Asn Ile Glu Asn Ser Gln
130 135 140

Pro Gln Pro Thr Pro Ser Lys Val Asp Asn Gln Val Thr Asp Ala Thr
145 150 155 160

Asn Pro Lys Glu Pro Val Asn Val Ser Lys Glu Glu Leu Lys Asn Asn
165 170 175

Pro Glu Lys Leu Lys Glu Leu Val Arg Asn Asp Ser Asn Thr Asp His
180 185 190

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

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 Lys Glu Lys Pro
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 <211> 995
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 <213> Staphylococcus aureus
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 35 40 45
 Lys Ala Ala Glu His Thr Asn Gly Glu Leu Asn Gln Ser Lys Asn Glu
 50 55 60
 Thr Thr Ala Pro Ser Glu Asn Lys Thr Thr Lys Lys Val Asp Ser Arg
 65 70 75 80
 Gln Leu Lys Asp Asn Thr Gln Thr Ala Thr Ala Asp Gln Pro Lys Val
 85 90 95
 Thr Met Ser Asp Ser Ala Thr Val Lys Glu Thr Ser Ser Asn Met Gln
 100 105 110
 Ser Pro Gln Asn Ala Thr Ala Asn Gln Ser Thr Thr Lys Thr Ser Asn
 115 120 125
 Val Thr Thr Asn Asp Lys Ser Ser Thr Thr Tyr Ser Asn Glu Thr Asp
 130 135 140
 Lys Ser Asn Leu Thr Gln Ala Lys Asp Val Ser Thr Thr Pro Lys Thr
 145 150 155 160
 Thr Thr Ile Lys Pro Arg Thr Leu Asn Arg Met Ala Val Asn Thr Val
 165 170 175
 Ala Ala Pro Gln Gln Gly Thr Asn Val Asn Asp Lys Val His Phe Ser
 180 185 190
 Asn Ile Asp Ile Ala Ile Asp Lys Gly His Val Asn Gln Thr Thr Gly
 195 200 205
 Lys Thr Glu Phe Trp Ala Thr Ser Ser Asp Val Leu Lys Leu Lys Ala
 210 215 220
 Asn Tyr Thr Ile Asp Asp Ser Val Lys Glu Gly Asp Thr Phe Thr Phe
 225 230 235 240
 Lys Tyr Gly Gln Tyr Phe Arg Pro Gly Ser Val Arg Leu Pro Ser Gln
 245 250 255
 Thr Gln Asn Leu Tyr Asn Ala Gln Gly Asn Ile Ile Ala Lys Gly Ile
 260 265 270
 Tyr Asp Ser Thr Thr Asn Thr Thr Thr Tyr Thr Phe Thr Asn Tyr Val
 275 280 285

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Asp Gln Tyr Thr Asn Val Arg Gly Ser Phe Glu Gln Val Ala Phe Ala
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 Lys Arg Lys Asn Ala Thr Thr Asp Lys Thr Ala Tyr Lys Met Glu Val
 305 310 315 320
 Thr Leu Gly Asn Asp Thr Tyr Ser Glu Glu Ile Ile Val Asp Tyr Gly
 325 330 335
 Asn Lys Lys Ala Gln Pro Leu Ile Ser Ser Thr Asn Tyr Ile Asn Asn
 340 345 350
 Glu Asp Leu Ser Arg Asn Met Thr Ala Tyr Val Asn Gln Pro Lys Asn
 355 360 365
 Thr Tyr Thr Lys Gln Thr Phe Val Thr Asn Leu Thr Gly Tyr Lys Phe
 370 375 380
 Asn Pro Asn Ala Lys Asn Phe Lys Ile Tyr Glu Val Thr Asp Gln Asn
 385 390 395 400
 Gln Phe Val Asp Ser Phe Thr Pro Asp Thr Ser Lys Leu Lys Asp Val
 405 410 415
 Thr Asp Gln Phe Asp Val Ile Tyr Ser Asn Asp Asn Lys Thr Ala Thr
 420 425 430
 Val Asp Leu Met Lys Gly Gln Thr Ser Ser Asn Lys Gln Tyr Ile Ile
 435 440 445
 Gln Gln Val Ala Tyr Pro Asp Asn Ser Ser Thr Asp Asn Gly Lys Ile
 450 455 460
 Asp Tyr Thr Leu Asp Thr Asp Lys Thr Lys Tyr Ser Trp Ser Asn Ser
 465 470 475 480
 Tyr Ser Asn Val Asn Gly Ser Ser Thr Ala Asn Gly Asp Gln Lys Lys
 485 490 495
 Tyr Asn Leu Gly Asp Tyr Val Trp Glu Asp Thr Asn Lys Asp Gly Lys
 500 505 510
 Gln Asp Ala Asn Glu Lys Gly Ile Lys Gly Val Tyr Val Ile Leu Lys
 515 520 525
 Asp Ser Asn Gly Lys Glu Leu Asp Arg Thr Thr Thr Asp Glu Asn Gly
 530 535 540
 Lys Tyr Gln Phe Thr Gly Leu Ser Asn Gly Thr Tyr Ser Val Glu Phe
 545 550 555 560
 Ser Thr Pro Ala Gly Tyr Thr Pro Thr Thr Ala Asn Val Gly Thr Asp
 565 570 575
 Asp Ala Val Asp Ser Asp Gly Leu Thr Thr Thr Gly Val Ile Lys Asp
 580 585 590
 Ala Asp Asn Met Thr Leu Asp Ser Gly Phe Tyr Lys Thr Pro Lys Tyr
 595 600 605
 Ser Leu Gly Asp Tyr Val Trp Tyr Asp Ser Asn Lys Asp Gly Lys Gln
 610 615 620
 Asp Ser Thr Glu Lys Gly Ile Lys Gly Val Lys Val Thr Leu Gln Asn
 625 630 635 640
 Glu Lys Gly Glu Val Ile Gly Thr Thr Glu Thr Asp Glu Asn Gly Lys
 645 650 655

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Tyr Arg Phe Asp Asn Leu Asp Ser Gly Lys Tyr Lys Val Ile Phe Glu
 660 665 670
 Lys Pro Ala Gly Leu Thr Gln Thr Gly Thr Asn Thr Thr Glu Asp Asp
 675 680 685
 Lys Asp Ala Asp Gly Gly Glu Val Asp Val Thr Ile Thr Asp His Asp
 690 695 700
 Asp Phe Thr Leu Asp Asn Gly Tyr Tyr Glu Glu Glu Thr Ser Asp Ser
 705 710 715 720
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 725 730 735
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 740 745 750
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 755 760 765
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 770 775 780
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 785 790 795 800
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
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 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 820 825 830
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 835 840 845
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 850 855 860
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 865 870 875 880
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 885 890 895
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 900 905 910
 Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser Asp Ser
 915 920 925
 Asp Ser Asp Ser Asp Ser Asp Ala Gly Lys His Thr Pro Ala Lys Pro
 930 935 940
 Met Ser Thr Val Lys Asp Gln His Lys Thr Ala Lys Ala Leu Pro Glu
 945 950 955 960
 Thr Gly Ser Glu Asn Asn Asn Ser Asn Asn Gly Thr Leu Phe Gly Gly
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 Gln Asn Lys
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<210> 11

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<211> 468

<212> PRT

<213> Staphylococcus aureus

<400> 11

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

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Asn Ala Lys Asn Phe Lys Ile Tyr Glu Val Thr Asp Gln Asn Gln Phe
 340 345 350
 Val Asp Ser Phe Thr Pro Asp Thr Ser Lys Leu Lys Asp Val Thr Asp
 355 360 365
 Gln Phe Asp Val Ile Tyr Ser Asn Asp Asn Lys Thr Ala Thr Val Asp
 370 375 380
 Leu Met Lys Gly Gln Thr Ser Ser Asn Lys Gln Tyr Ile Ile Gln Gln
 385 390 395 400
 Val Ala Tyr Pro Asp Asn Ser Ser Thr Asp Asn Gly Lys Ile Asp Tyr
 405 410 415
 Thr Leu Asp Thr Asp Lys Thr Lys Tyr Ser Trp Ser Asn Ser Tyr Ser
 420 425 430
 Asn Val Asn Gly Ser Ser Thr Ala Asn Gly Asp Gln Lys Lys Tyr Asn
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 Leu Gly Asp Tyr Val Trp Glu Asp Thr Asn Lys Asp Gly Lys Gln Asp
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Ala Asn Glu Lys
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 35 40 45
 Ile Leu Ser Lys Gln Asp Leu Leu Asp Lys Val Asp Lys Ala Ile Arg
 50 55 60
 Gln Ile Glu Gln Leu Lys Gln Leu Ser Ala Ser Ser Lys Glu His Tyr
 65 70 75 80
 Lys Ala Gln Leu Asn Glu Ala Lys Thr Ala Ser Gln Ile Asp Glu Ile
 85 90 95
 Ile Lys Arg Ala Asn Glu Leu Asp Ser Lys Asp Asn Lys Ser Ser His
 100 105 110
 Thr Glu Met Asn Gly Gln Ser Asp Ile Asp Ser Lys Leu Asp Gln Leu
 115 120 125
 Leu Lys Asp Leu Asn Glu Val Ser Ser Asn Val Asp Arg Gly Gln Gln
 130 135 140
 Ser Gly Glu Asp Asp Leu Asn Ala Met Lys Asn Asp Met Ser Gln Thr
 145 150 155 160
 Ala Thr Thr Lys His Gly Glu Lys Asp Asp Lys Asn Asp Glu Ala Met
 165 170 175
 Val Asn Lys Ala Leu Glu Asp Leu Asp His Leu Asn Gln Gln Ile His
 180 185 190

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Lys Ser Lys Asp Ala Ser Lys Asp Thr Ser Glu Asp Pro Ala Val Ser
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 Thr Thr Asp Asn Asn His Glu Val Ala Lys Thr Pro Asn Asn Asp Gly
 210 215 220
 Ser Gly His Val Val Leu Asn Lys Phe Leu Ser Asn Glu Glu Asn Gln
 225 230 235 240
 Ser His Ser Asn Arg Leu Thr Asp Lys Leu Gln Gly Ser Asp Lys Ile
 245 250 255
 Asn His Ala Met Ile Glu Lys Leu Ala Lys Ser Asn Ala Ser Thr Gln
 260 265 270
 His Tyr Thr Tyr His Lys Leu Asn Thr Leu Gln Ser Leu Asp Gln Arg
 275 280 285
 Ile Ala Asn Thr Gln Leu Pro Lys Asn Gln Lys Ser Asp Leu Met Ser
 290 295 300
 Glu Val Asn Lys Thr Lys Glu Arg Ile Lys Ser Gln Arg Asn Ile Ile
 305 310 315 320
 Leu Glu Glu Leu Ala Arg Thr Asp Asp Lys Lys Tyr Ala Thr Gln Ser
 325 330 335
 Ile Leu Glu Ser Ile Phe Asn Lys Asp Glu Ala Val Lys Ile Leu Lys
 340 345 350
 Asp Ile Arg Val Asp Gly Lys Thr Asp Gln Gln Ile Ala Asp Gln Ile
 355 360 365
 Thr Arg His Ile Asp Gln Leu Ser Leu Thr Thr Ser Asp Asp Leu Leu
 370 375 380
 Thr Ser Leu Ile Asp Gln Ser Gln Asp Lys Ser Leu Leu Ile Ser Gln
 385 390 395 400
 Ile Leu Gln Thr Lys Leu Gly Lys Ala Glu Ala Asp Lys Leu Ala Lys
 405 410 415
 Asp Trp Thr Asn Lys Gly Leu Ser Asn Arg Gln Ile Val Asp Gln Leu
 420 425 430
 Lys Lys His Phe Ala Ser Thr Gly Asp Thr Ser Ser Asp Asp Ile Leu
 435 440 445
 Lys Ala Ile Leu Asn Asn Ala Lys Asp Lys Lys Gln Ala Ile Glu Thr
 450 455 460
 Ile Leu Ala Thr Arg Ile Glu Arg Gln Lys Ala Lys Leu Leu Ala Asp
 465 470 475 480
 Leu Ile Thr Lys Ile Glu Thr Asp Gln Asn Lys Ile Phe Asn Leu Val
 485 490 495
 Lys Ser Ala Leu Asn Gly Lys Ala Asp Asp Leu Leu Asn Leu Gln Lys
 500 505 510
 Arg Leu Asn Gln Thr Lys Lys Asp Ile Asp Tyr Ile Leu Ser Pro Ile
 515 520 525
 Val Asn Arg Pro Ser Leu Leu Asp Arg Leu Asn Lys Asn Gly Lys Thr
 530 535 540
 Thr Asp Leu Asn Lys Leu Ala Asn Leu Met Asn Gln Gly Ser Asp Leu

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545 550 555 560
 Leu Asp Ser Ile Pro Asp Ile Pro Thr Pro Lys Pro Glu Lys Thr Leu
 565 570 575
 Thr Leu Gly Lys Gly Asn Gly Leu Leu Ser Gly Leu Leu Asn Ala Asp
 580 585 590
 Gly Asn Val Ser Leu Pro Lys Ala Gly Glu Thr Ile Lys Glu His Trp
 595 600 605
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 <213> Staphylococcus aureus
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 35 40 45
 Ala Tyr Asp Glu Phe Lys Asn Ser Pro Lys Val Asn Val Ser Asn Leu
 50 55 60
 Thr Asp Asn Lys Asn Phe Val Ala Ser Glu Asp Lys Leu Asn Lys Ile
 65 70 75 80
 Ala Asp Ser Ser Ala Ala Ser Lys Ile Val Asp Lys Asn Phe Val Val
 85 90 95
 Pro Glu Ser Lys Leu Gly Asn Ile Val Pro Glu Tyr Lys Glu Ile Asn
 100 105 110
 Asn Arg Val Asn Val Ala Thr Asn Asn Pro Ala Ser Gln Gln Val Asp
 115 120 125
 Lys His Phe Val Ala Lys Gly Pro Glu Val Asn Arg Phe Ile Thr Gln
 130 135 140
 Asn Lys Val Asn His His Phe Ile Thr Thr Gln Thr His Tyr Lys Lys
 145 150 155 160
 Val Ile Thr Ser Tyr Lys Ser Thr His Val His Lys His Val Asn His
 165 170 175
 Ala Lys Asp Ser Ile Asn Lys His Phe Ile Val Lys Pro Ser Glu Ser
 180 185 190
 Pro Arg Tyr Thr His Pro Ser Gln Ser Leu Ile Ile Lys His His Phe
 195 200 205
 Ala Val Pro Gly Tyr His Ala His Lys Phe Val Thr Pro Gly His Ala
 210 215 220
 Ser Ile Lys Ile Asn His Phe Cys Val Val Pro Gln Ile Asn Ser Phe
 225 230 235 240

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Lys Val Ile Pro Pro Tyr Gly His Asn Ser His Arg Met His Val Pro
245 250 255
Ser Phe Gln Asn Asn Thr Thr Ala Thr His Gln Asn Ala Lys Val Asn
260 265 270
Lys Ala Tyr Asp Tyr Lys Tyr Phe Tyr Ser Tyr Lys Val Val Lys Gly
275 280 285
Val Lys Lys Tyr Phe Ser Phe Ser Gln Ser Asn Gly Tyr Lys Ile Gly
290 295 300
Lys Pro Ser Leu Asn Ile Lys Asn Val Asn Tyr Gln Tyr Ala Val Pro
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Ala Pro Arg Val
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<210> 14
<211> 306
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<213> Staphylococcus aureus

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35 40 45
Ser Ser Ala Ala Ser Lys Ile Val Asp Lys Asn Phe Val Val Pro Glu
50 55 60
Ser Lys Leu Gly Asn Ile Val Pro Glu Tyr Lys Glu Ile Asn Asn Arg
65 70 75 80
Val Asn Val Ala Thr Asn Asn Pro Ala Ser Gln Gln Val Asp Lys His
85 90 95
Phe Val Ala Lys Gly Pro Glu Val Asn Arg Phe Ile Thr Gln Asn Lys
100 105 110
Val Asn His His Phe Ile Thr Thr Gln Thr His Tyr Lys Lys Val Ile
115 120 125
Thr Ser Tyr Lys Ser Thr His Val His Lys His Val Asn His Ala Lys
130 135 140
Asp Ser Ile Asn Lys His Phe Ile Val Lys Pro Ser Glu Ser Pro Arg
145 150 155 160
Tyr Thr His Pro Ser Gln Ser Leu Ile Ile Lys His His Phe Ala Val
165 170 175
Pro Gly Tyr His Ala His Lys Phe Val Thr Pro Gly His Ala Ser Ile
180 185 190
Lys Ile Asn His Phe Cys Val Val Pro Gln Ile Asn Ser Phe Lys Val
195 200 205
Ile Pro Pro Tyr Gly His Asn Ser His Arg Met His Val Pro Ser Phe
210 215 220

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Gln Asn Asn Thr Thr Ala Thr His Gln Asn Ala Lys Val Asn Lys Ala
 225 230 235 240
 Tyr Asp Tyr Lys Tyr Phe Tyr Ser Tyr Lys Val Val Lys Gly Val Lys
 245 250 255
 Lys Tyr Phe Ser Phe Ser Gln Ser Asn Gly Tyr Lys Ile Gly Lys Pro
 260 265 270
 Ser Leu Asn Ile Lys Asn Val Asn Tyr Gln Tyr Ala Val Pro Ser Tyr
 275 280 285
 Ser Pro Thr His Tyr Val Pro Glu Phe Lys Gly Ser Leu Pro Ala Pro
 290 295 300

Arg Val
 305

<210> 15
 <211> 308
 <212> PRT
 <213> Staphylococcus aureus

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 35 40 45
 Asp Lys Leu Asn Lys Ile Ala Asp Ser Ser Ala Ala Ser Lys Ile Val
 50 55 60
 Asp Lys Asn Phe Val Val Pro Glu Ser Lys Leu Gly Asn Ile Val Pro
 65 70 75 80
 Glu Tyr Lys Glu Ile Asn Asn Arg Val Asn Val Ala Thr Asn Asn Pro
 85 90 95
 Ala Ser Gln Gln Val Asp Lys His Phe Val Ala Lys Gly Pro Glu Val
 100 105 110
 Asn Arg Phe Ile Thr Gln Asn Lys Val Asn His His Phe Ile Thr Thr
 115 120 125
 Gln Thr His Tyr Lys Lys Val Ile Thr Ser Tyr Lys Ser Thr His Val
 130 135 140
 His Lys His Val Asn His Ala Lys Asp Ser Ile Asn Lys His Phe Ile
 145 150 155 160
 Val Lys Pro Ser Glu Ser Pro Arg Tyr Thr His Pro Ser Gln Ser Leu
 165 170 175
 Ile Ile Lys His His Phe Ala Val Pro Gly Tyr His Ala His Lys Phe
 180 185 190
 Val Thr Pro Gly His Ala Ser Ile Lys Ile Asn His Phe Cys Val Val
 195 200 205
 Pro Gln Ile Asn Ser Phe Lys Val Ile Pro Pro Tyr Gly His Asn Ser
 210 215 220
 His Arg Met His Val Pro Ser Phe Gln Asn Asn Thr Thr Ala Thr His

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225											230											235											240
Gln	Asn	Ala	Lys	Val	Asn	Lys	Ala	Tyr	Asp	Tyr	Lys	Tyr	Phe	Tyr	Ser	Gln	Ser	Val	Ala	Pro	Leu	Asn	Ile	Lys	Asn	Val	Asn						
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Tyr	Lys	Val	Val	Lys	Gly	Val	Lys	Lys	Tyr	Phe	Ser	Phe	Ser	Gln	Ser	Val	Asn	Val	Ala	Pro	Leu	Asn	Ile	Lys	Asn	Val	Asn						
				275					280					285					290					295					300				
Asn	Gly	Tyr	Lys	Ile	Gly	Lys	Pro	Ser	Leu	Asn	Ile	Lys	Asn	Val	Asn	Val	Asn	Val	Ala	Pro	Leu	Asn	Ile	Lys	Asn	Val	Asn						
Tyr	Gln	Tyr	Ala	Val	Pro	Ser	Tyr	Ser	Pro	Thr	His	Tyr	Val	Pro	Glu																		
				305																													
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Glu Tyr Lys Glu Ile Asn Asn Arg Val Asn Val Ala Thr Asn Asn Pro
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65 70 75 80
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 Asp Ala Ile Lys Ser Asn Asp Glu Thr Leu Val Asp Asn Asn Ser Asn
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 Pro Lys Arg Leu Asn Thr Arg Met Arg Ile Ala Ala Val Gln Pro Ser
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 580 585 590
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Thr Asn Lys Asn Gly Val Gln Asp Lys Asp Glu Lys Gly Ile Ser Gly
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Val Thr Val Thr Leu Lys Asp Glu Asn Asp Lys Val Leu Lys Thr Val
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945 950 955 960

Thr Tyr Lys Val Glu Phe Glu Thr Pro Ser Gly Tyr Thr Pro Thr Ser
965 970 975

Val Thr Ser Gly Asn Asp Thr Glu Lys Asp Ser Asn Gly Leu Thr Thr
980 985 990

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

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1125 1130 1135

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1250 1255 1260
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1265 1270 1275 1280
Asp Ser Asp Ser Asp Ser Asp Ser Asp Ala Gly Lys His Thr Pro Val
1285 1290 1295
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Pro Glu Thr Gly Ser Glu Asn Asn Gly Ser Asn Asn Ala Thr Leu Phe
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50 55 60
Gln Ser Thr Thr Gly Asn Lys Val Glu Val Ser Thr Ala Lys Ser Asp
65 70 75 80
Glu Gln Ala Ser Pro Lys Ser Thr Asn Glu Asp Leu Asn Thr Lys Gln
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Thr Ile Ser Asn Gln Glu Ala Leu Gln Pro Asp Leu Gln Glu Asn Lys
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Ser Val Val Asn Val Gln Pro Thr Asn Glu Glu Asn Lys Lys Val Asp
115 120 125
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pctib2010054934-seq1
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 Tyr Thr Leu Asn Lys Gly Tyr Asp Val Asn Thr Lys Glu Leu Thr Asp
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 Val Thr Asn Gln Tyr Leu Gln Lys Ile Thr Tyr Gly Asp Asn Asn Ser
 100 105 110
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 115 120 125
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 145 150 155 160
 Ala Leu Gly Phe Thr Asn Asn Gln Ser Gly Gly Ala Gly Gln Glu Val
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 Gln Val Leu Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe
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 Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu Gly
 65 70 75 80

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 Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn
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 Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser
 180 185 190
 Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln
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 Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
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 405 410 415
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 Asp Ile Ala Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala Asp
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35 40 45

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50 55 60

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65 70 75 80

Pro Asn Thr Leu Tyr Ile Glu Lys Arg Asn Leu Met Lys Gln Lys Leu
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 35 40 45
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 50 55 60
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 35 40 45
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 Gly Ala Asn Ile Val Ala Val Asn Gln Gln Val Asp Gln Ser Lys Val
 65 70 75 80
 Leu Lys Asp Lys Phe Lys Gly Val Thr Lys Ile Gly Asp Gly Asp Val
 85 90 95
 Glu Lys Val Ala Lys Glu Lys Pro Asp Leu Ile Ile Val Tyr Ser Thr
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 130 135 140
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 145 150 155 160
 Glu Thr Thr Ala Lys Asp Gly Lys Glu Ile Lys Lys Ala Ile Gly Gln
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 210 215 220
 Trp Ala Glu Val Lys Gln Glu Glu Ile Glu Lys Tyr Ala Gly Asp Tyr
 225 230 235 240
 Ile Val Ser Thr Ser Glu Gly Lys Pro Thr Pro Gly Tyr Glu Ser Thr
 245 250 255
 Asn Met Trp Lys Asn Leu Lys Ala Thr Lys Glu Gly His Ile Val Lys
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 115 120 125
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50 55 60

Phe Tyr Ser Phe Ile Asp Asp Lys Asn His Asn Lys Lys Leu Leu Val
65 70 75 80

Ile Arg Thr Lys Gly Thr Ile Ala Gly Gln Tyr Arg Val Tyr Ser Glu
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Glu Gly Ala Asn Lys Ser Gly Leu Ala Trp Pro Ser Ala Phe Lys Val
100 105 110

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115 120 125

Pro Arg Asn Ser Ile Asp Thr Lys Glu Tyr Met Ser Thr Leu Thr Tyr
130 135 140

Gly Phe Asn Gly Asn Val Thr Gly Asp Asp Thr Gly Lys Ile Gly Gly
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Leu Ile Gly Ala Asn Val Ser Ile Gly His Thr Leu Lys Tyr Val Gln
165 170 175

Pro Asp Phe Lys Thr Ile Leu Glu Ser Pro Thr Asp Lys Lys Val Gly
180 185 190

Trp Lys Val Ile Phe Asn Asn Met Val Asn Gln Asn Trp Gly Pro Tyr
195 200 205

Asp Arg Asp Ser Trp Asn Pro Val Tyr Gly Asn Gln Leu Phe Met Lys
210 215 220

Thr Arg Asn Gly Ser Met Lys Ala Ala Asp Asn Phe Leu Asp Pro Asn
225 230 235 240

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245 250 255

Val Ile Thr Met Asp Arg Lys Ala Ser Lys Gln Gln Thr Asn Ile Asp
260 265 270

Val Ile Tyr Glu Arg Val Arg Asp Asp Tyr Gln Leu His Trp Thr Ser
275 280 285

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

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 Gln Ile Ser Asp Tyr Tyr Pro Arg Asn Ser Ile Asp Thr Pro Ser Gly
 100 105 110
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 115 120 125
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 Asp Pro Asn Lys Ala Ser Ser Leu Leu Ser Ser Gly Phe Ser Pro Asp
 180 185 190
 Phe Ala Thr Val Ile Thr Met Asp Arg Lys Ala Ser Lys Gln Gln Thr
 195 200 205
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 210 215 220
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Thr Asn

<210> 33
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 <213> Staphylococcus aureus

<400> 33
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Asn Thr Thr Val Lys Thr Gly Asp Leu Val Thr Tyr Asp Lys Glu Asn
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<400> 37
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 <211> 53
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 Asp Glu Asp Glu Gly Lys Pro His Asp Asn Glu Lys Arg Tyr Pro Val
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 130 135 140
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Pro Glu Val Pro Ser Tyr Ser Ala Lys Tyr Gln Leu Thr Asn Asp Asp
180 185 190
Tyr Asn Val Lys Gln Leu Arg Lys Arg Tyr Asp Ile Pro Thr Ser Lys
195 200 205
Ala Pro Lys Leu Leu Leu Lys Gly Ser Gly Asn Leu Lys Gly Ser Ser
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35 40 45
Leu Glu Asp Leu Tyr Asp Lys Glu Gly Tyr Arg Asp Asp Gln Phe Asp
50 55 60
Lys Asn Asp Lys Gly Thr Trp Ile Ile Asn Ser Glu Met Val Ile Gln
65 70 75 80
Pro Asn Asn Glu Asp Met Val Ala Lys Gly Met Val Leu Tyr Met Asn
85 90 95
Arg Asn Thr Lys Thr Thr Asn Gly Tyr Tyr Tyr Val Asp Val Thr Lys
100 105 110
Asp Glu Asp Glu Gly Lys Pro His Asp Asn Glu Lys Arg Tyr Pro Val
115 120 125
Lys Met Val Asp Asn Lys Ile Ile Pro Thr Lys Glu Ile Lys Asp Glu
130 135 140
Lys Leu Lys Lys Glu Ile Glu Asn Phe Lys Phe Phe Val Gln Tyr Gly
145 150 155 160
Asp Phe Lys Asn Ile Lys Asn Tyr Lys Asp Gly Asp Ile Ser Tyr Asn
165 170 175
Pro Glu Val Pro Ser Tyr Ser Ala Lys Tyr Gln Leu Thr Asn Asp Asp
180 185 190
Tyr Asn Val Lys Gln Leu Arg Lys Arg Tyr Asp Ile Pro Thr Ser Lys
195 200 205
Ala Pro Lys Leu Leu Leu Lys Gly Ser Gly Asn Leu Lys Gly Ser Ser
210 215 220
Val Gly Tyr Lys Asp Ile Glu Phe Thr Phe Val Glu Lys Lys Glu Glu
225 230 235 240

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<210> 41
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35 40 45
Leu Glu Asp Leu Tyr Asp Lys Glu Gly Tyr Arg Asp Asp Gln Phe Asp
50 55 60
Lys Asn Asp Lys Gly Thr Trp Ile Ile Asn Ser Glu Met Val Ile Gln
65 70 75 80
Pro Asn Asn Glu Asp Met Val Ala Lys Gly Met Val Leu Tyr Met Asn
85 90 95
Arg Asn Thr Lys Thr Thr Asn Gly Tyr Tyr Tyr Val Asp Val Thr Lys
100 105 110
Asp Glu Asp Glu Gly Lys Pro His Asp Asn Glu Lys Arg Tyr Pro Val
115 120 125
Lys Met Val Asp Asn Lys Ile Ile Pro Thr Lys Glu Ile Lys Asp Glu
130 135 140
Lys Val Lys Lys Glu Ile Glu Asn Phe Lys Phe Phe Val Gln Tyr Gly
145 150 155 160
Asp Phe Lys Asn Ile Lys Asn Tyr Lys Asp Gly Asp Ile Ser Tyr Asn
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Pro Glu Val Pro Ser Tyr Ser Ala Lys Tyr Gln Leu Thr Asn Asp Asp
180 185 190
Tyr Asn Val Lys Gln Leu Arg Lys Arg Tyr Asp Ile Pro Thr Ser Lys
195 200 205
Ala Pro Lys Leu Leu Leu Lys Gly Ser Gly Asn Leu Lys Gly Ser Ser
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<210> 42
<211> 256
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<400> 42
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 65 70 75 80
 Pro Asn Asn Glu Asp Met Val Ala Lys Gly Met Val Leu Tyr Met Asn
 85 90 95
 Arg Asn Thr Lys Thr Thr Asn Gly Tyr Tyr Tyr Val Asp Val Thr Lys
 100 105 110
 Asp Glu Asp Glu Gly Lys Pro His Asp Asn Glu Lys Arg Tyr Pro Val
 115 120 125
 Lys Met Val Asp Asn Lys Ile Ile Pro Thr Lys Glu Ile Lys Asp Glu
 130 135 140
 Lys Leu Lys Lys Glu Ile Glu Asn Phe Lys Phe Phe Val Gln Tyr Gly
 145 150 155 160
 Asp Phe Lys Asn Val Lys Asn Tyr Lys Asp Gly Asp Ile Ser Tyr Asn
 165 170 175
 Pro Glu Val Pro Ser Tyr Ser Ala Lys Tyr Gln Leu Thr Asn Asp Asp
 180 185 190
 Tyr Asn Val Lys Gln Leu Arg Lys Arg Tyr Asp Ile Pro Thr Ser Lys
 195 200 205
 Ala Pro Lys Leu Leu Leu Lys Gly Ser Gly Asn Leu Lys Gly Ser Ser
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 <213> Staphylococcus aureus

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 Lys Ser His Met Asp Asp Tyr Met Gln His Pro Gly Lys Val Ile Lys
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Gln Asn Asn Lys Tyr Tyr Phe Gln Thr Val Leu Asn Asn Ala Ser Phe
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Trp Lys Glu Tyr Lys Phe Tyr Asn Ala Asn Asn Gln Glu Leu Ala Thr
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Thr Val Val Asn Asp Asn Lys Lys Ala Asp Thr Arg Thr Ile Asn Val
130 135 140
Ala Val Glu Pro Gly Tyr Lys Ser Leu Thr Thr Lys Val His Ile Val
145 150 155 160
Val Pro Gln Ile Asn Tyr Asn His Arg Tyr Thr Thr His Leu Glu Phe
165 170 175
Glu Lys Ala Ile Pro Thr Leu Ala Asp Ala Ala Lys Pro Asn Asn Val
180 185 190
Lys Pro Val Gln Pro Lys Pro Ala Gln Pro Lys Thr Pro Thr Glu Gln
195 200 205
Thr Lys Pro Val Gln Pro Lys Val Glu Lys Val Lys Pro Thr Val Thr
210 215 220
Thr Thr Ser Lys Val Glu Asp Asn His Ser Thr Lys Val Val Ser Thr
225 230 235 240
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245 250 255
Thr Ala Gln Thr Ala Gln Glu Gln Asn Lys Val Gln Thr Pro Val Lys
260 265 270
Asp Val Ala Thr Ala Lys Ser Glu Ser Asn Asn Gln Ala Val Ser Asp
275 280 285
Asn Lys Ser Gln Gln Thr Asn Lys Val Thr Lys His Asn Glu Thr Pro
290 295 300
Lys Gln Ala Ser Lys Ala Lys Glu Leu Pro Lys Thr Gly Leu Thr Ser
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<213> Staphylococcus aureus

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35 40 45
Met Gln His Pro Gly Lys Val Ile Lys Gln Asn Asn Lys Tyr Tyr Phe
50 55 60
Gln Thr Val Leu Asn Asn Ala Ser Phe Trp Lys Glu Tyr Lys Phe Tyr
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<212> PRT
<213> Staphylococcus aureus

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Thr Ser Glu Lys Ala Pro Glu Thr Lys Pro Val Ala Asn Ala Val Ser
65 70 75 80
Val Ser Asn Lys Glu Val Glu Ala Pro Thr Ser Glu Thr Lys Glu Ala
85 90 95
Lys Glu Val Lys Glu Val Lys Ala Pro Lys Glu Thr Lys Glu Val Lys
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Pro Ala Ala Lys Ala Thr Asn Asn Thr Tyr Pro Ile Leu Asn Gln Glu
115 120 125
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130 135 140
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165 170 175
Ile Phe Thr Asp Ser Lys Pro Glu Ile Glu Leu Gly Leu Gln Ser Gly
180 185 190
Gln Phe Trp Arg Lys Phe Glu Val Tyr Glu Gly Asp Lys Lys Leu Pro
195 200 205
Ile Lys Leu Val Ser Tyr Asp Thr Val Lys Asp Tyr Ala Tyr Ile Arg
210 215 220
Phe Ser Val Ser Asn Gly Thr Lys Ala Val Lys Ile Val Ser Ser Thr
225 230 235 240
His Phe Asn Asn Lys Glu Glu Lys Tyr Asp Tyr Thr Leu Met Glu Phe
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Arg	Val	Arg	Thr	Ile	Ser	Lys	Asp	Ala	Lys	Asn	Asn	Thr	Arg	Thr	Ile				
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<211> 1256
<212> PRT
<213> Staphylococcus aureus

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65 70 75 80

Lys Thr Ala Asn Asn Lys Thr Gly Asn Ala Gln Val Ser Gln Lys Val
85 90 95

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100 105 110

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

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130 135 140

Glu Asp Asp Asn Ser Glu Asn Gln Ile Asn Pro Glu Leu Ile Lys Ser
145 150 155 160

Ala Ala Lys Pro Ala Ala Leu Glu Thr Gln Tyr Lys Thr Ala Ala Pro
165 170 175

Lys Ala Ala Thr Thr Ser Ala Pro Lys Ala Lys Thr Glu Ala Thr Pro
180 185 190

Lys Val Thr Thr Phe Ser Ala Ser Ala Gln Pro Arg Ser Val Ala Ala
195 200 205

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210 215 220

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225 230 235 240

Glu Asp Tyr Thr Ser Tyr Phe Pro Lys Tyr Ala Tyr Arg Asn Gly Val
245 250 255

Gly Arg Pro Glu Gly Ile Val Val His Asp Thr Ala Asn Asp Arg Ser
260 265 270

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275 280 285

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Pro His Gly Tyr Leu Arg Ser His Asn Tyr Ser Tyr Asp Gln Leu Tyr
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Gln Val Ala Gly Ser Val Ser Gly Ser Gly Asn Gln Thr Phe Lys Ala
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Ser Lys Gln Gln Gln Ile Asp Lys Ser Ile Tyr Leu Tyr Gly Ser Val
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Asn Gly Lys Ser Gly Trp Val Ser Lys Ala Tyr Leu Val Asp Thr Ala
580 585 590
Lys Pro Thr Pro Thr Pro Thr Pro Lys Pro Ser Thr Pro Thr Thr Asn
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Asn Lys Leu Thr Val Ser Ser Leu Asn Gly Val Ala Gln Ile Asn Ala
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Gly	Thr	Gly	Asn	Gln	Thr	Phe	Lys	Ala	Thr	Lys	Gln	Gln	Gln	Ile	Asp															
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Ser	Lys	Ala	Tyr	Leu	Ala	Val	Pro	Ala	Ala	Pro	Lys	Lys	Ala	Val	Ala															
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Gln	Pro	Lys	Thr	Ala	Val	Lys	Ala	Tyr	Thr	Val	Thr	Lys	Pro	Gln	Thr															
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Phe	Asn	Val	Lys	Asp	Leu	Asn	Val	Gln	Asn	Leu	Gly	Lys	Glu	Val	Lys															
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			885						890					895																
Ala	Gln	Gly	Thr	Phe	Asn	Ala	Thr	Lys	Gln	Val	Ser	Val	Gly	Lys	Asp															
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Thr Leu Asn Gln Val Ala Gln Ile Gln Ala Gly Leu Gln Tyr Lys Pro
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Gln Val Gln Arg Val Pro Gly Lys Trp Thr Asp Ala Lys Phe Asn Asp
1045 1050 1055

Val Lys His Ala Met Asp Thr Lys Arg Leu Ala Gln Asp Pro Ala Leu
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Lys Tyr Gln Phe Leu Arg Leu Asp Gln Pro Gln Asn Ile Ser Ile Asp
1075 1080 1085

Lys Ile Asn Gln Phe Leu Lys Gly Lys Gly Val Leu Glu Asn Gln Gly
1090 1095 1100

Ala Ala Phe Asn Lys Ala Ala Gln Met Tyr Gly Ile Asn Glu Val Tyr
1105 1110 1115 1120

Leu Ile Ser His Ala Leu Leu Glu Thr Gly Asn Gly Thr Ser Gln Leu
1125 1130 1135

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Thr Lys Tyr His Asn Val Phe Gly Ile Ala Ala Tyr Asp Asn Asp Pro
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Ser Lys Ala Ile Val Gly Gly Ala Lys Phe Ile Gly Asn Ser Tyr Val
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Lys Ala Gly Gln Asn Thr Leu Tyr Lys Met Arg Trp Asn Pro Ala His
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Pro Gly Thr His Gln Tyr Ala Thr Asp Val Asp Trp Ala Asn Ile Asn
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Ser Arg Phe Glu Glu Gln Phe Gln Gln Leu Ser Pro Lys Val Glu Lys
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Phe Ala Gln Leu Leu Glu Glu Ile Lys Gln Gln Leu Asn Ser Thr Ala
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Asp Ala Val Gln Glu Gln Asp Gln Gln Leu Ser Asn Asn Phe Gly Leu
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Gln Ala Ser Gly Gly Gly Ser Met Gly Gly Tyr Lys Gly Ile Lys Ala
100 105 110

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

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Gln	Leu	Leu	Glu	Glu	Ile	Lys	Gln	Gln	Leu	Asn	Ser	Thr	Ala	Asp	Ala
			180					185					190		
Val	Gln	Glu	Gln	Asp	Gln	Gln	Leu	Ser	Asn	Asn	Phe	Gly	Leu	Gln	
		195					200					205			