

# SEQUENCE LISTING

<110> Intercell AG

<120> Peptides protective against *S. pneumoniae* and compositions,  
methods and uses relating thereto

<130> ICP056-PCT

<150> EP06024006.6

<151> 2006-11-20

<160> 143

<170> PatentIn version 3.4

<210> 1

<211> 251

<212> PRT

<213> Artificial

<220>

<223> Construct 1: SP2216-1

<400> 1

Glu	Thr	Thr	Asp	Asp	Lys	Ile	Ala	Ala	Gln	Asp	Asn	Lys	Ile	Ser	Asn
1				5					10					15	

Leu	Thr	Ala	Gln	Gln	Gln	Glu	Ala	Gln	Lys	Gln	Val	Asp	Gln	Ile	Gln
			20					25					30		

Glu	Gln	Val	Ser	Ala	Ile	Gln	Ala	Glu	Gln	Ser	Asn	Leu	Gln	Ala	Glu
		35					40					45			

Asn	Asp	Arg	Leu	Gln	Ala	Glu	Ser	Lys	Lys	Leu	Glu	Gly	Glu	Ile	Thr
	50					55					60				

Glu	Leu	Ser	Lys	Asn	Ile	Val	Ser	Arg	Asn	Gln	Ser	Leu	Glu	Lys	Gln
65					70					75					80

Ala	Arg	Ser	Ala	Gln	Thr	Asn	Gly	Ala	Val	Thr	Ser	Tyr	Ile	Asn	Thr
				85					90					95	

Ile	Val	Asn	Ser	Lys	Ser	Ile	Thr	Glu	Ala	Ile	Ser	Arg	Val	Ala	Ala
			100					105					110		

Met	Ser	Glu	Ile	Val	Ser	Ala	Asn	Asn	Lys	Met	Leu	Glu	Gln	Gln	Lys
		115					120					125			

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

Ile Asn Thr Val Ile Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln  
145 150 155 160

Ala Leu Thr Thr Lys Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu  
165 170 175

Ala Ala Glu Lys Ala Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu  
180 185 190

Gln Lys Ala Ala Ala Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu  
195 200 205

Ala Ala Tyr Lys Glu Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala  
210 215 220

Ser Ala Asn Thr Asn Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser  
225 230 235 240

Ala Ala Ala Pro Val Arg Ala Lys Val Arg Pro  
245 250

<210> 2  
<211> 315  
<212> PRT  
<213> Artificial

<220>  
<223> Construct 2: SP1732-3

<400> 2

Tyr Leu Ile Leu Leu Ala Ser Leu Val Leu Val Ala Ala Ser Leu Ile  
1 5 10 15

Trp Ile Leu Ser Arg Thr Pro Ala Thr Ile Ala Ile Pro Asp Val Ala  
20 25 30

Gly Gln Thr Val Ala Glu Ala Lys Ala Thr Leu Lys Lys Ala Asn Phe  
35 40 45

Glu Ile Gly Glu Glu Lys Thr Glu Ala Ser Glu Lys Val Glu Glu Gly  
50 55 60

Arg Ile Ile Arg Thr Asp Pro Gly Ala Gly Thr Gly Arg Lys Glu Gly  
65 70 75 80

Thr Lys Ile Asn Leu Val Val Ser Ser Gly Lys Gln Ser Phe Gln Ile  
85 90 95

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

Glu Lys Lys Val Pro Asp Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
115 120 125

Asn Glu Ser Glu Ala Gly Thr Val Leu Lys Gln Ser Leu Pro Glu Gly  
130 135 140

Thr Thr Tyr Asp Leu Ser Lys Ala Thr Gln Ile Val Leu Thr Val Ala  
145 150 155 160

Lys Lys Ala Thr Thr Ile Gln Leu Gly Asn Tyr Ile Gly Arg Asn Ser  
165 170 175

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

Ile Lys Ile Glu Glu Glu Glu Ser Ser Glu Ser Glu Pro Gly Thr Ile  
195 200 205

Met Lys Gln Ser Pro Gly Ala Gly Thr Thr Tyr Asp Val Ser Lys Pro  
210 215 220

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

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

Gln Ile Val Gly Ile Lys Glu Ala Asn Ile Glu Val Val Glu Val Thr  
260 265 270

Thr Ala Pro Ala Gly Ser Val Glu Gly Met Val Val Glu Gln Ser Pro  
275 280 285

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

Ile Tyr Lys Pro Lys Thr Thr Ser Ala Thr Pro  
305 310 315

<210> 3  
<211> 289  
<212> PRT

<213> Artificial

<220>

<223> Construct 3: SP1650 (PsaA)

<400> 3

Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys Leu Lys Val Val  
1 5 10 15

Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn Ile Ala Gly Asp  
20 25 30

Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln Asp Pro His Glu  
35 40 45

Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser Glu Ala Asp Leu  
50 55 60

Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly Asn Ala Trp Phe  
65 70 75 80

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

Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu Gly Gln Asn Glu  
100 105 110

Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu Glu Asn Gly Ile  
115 120 125

Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala Lys Asp Pro Asn  
130 135 140

Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr Thr Asp Lys Leu  
145 150 155 160

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

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

Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu Ile Asn Thr Glu  
195 200 205

Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val Glu Lys Leu Arg  
210 215 220

Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser Val Asp Asp Arg  
225 230 235 240

Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro Ile Tyr Ala Gln  
245 250 255

Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu Gly Asp Ser Tyr  
260 265 270

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

Lys

<210> 4  
<211> 572  
<212> PRT  
<213> Artificial

<220>  
<223> Construct 4 & 5: SP2216-1 + SP1732-3

<400> 4

Glu Thr Thr Asp Asp Lys Ile Ala Ala Glu Asp Asn Lys Ile Ser Asn  
1 5 10 15

Leu Thr Ala Gln Gln Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln  
20 25 30

Glu Gln Val Ser Ala Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu  
35 40 45

Asn Asp Arg Leu Gln Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr  
50 55 60

Glu Leu Ser Lys Asn Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln  
65 70 75 80

Ala Arg Ser Ala Gln Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn Thr  
85 90 95

Ile Val Asn Ser Lys Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala  
100 105 110

Met Ser Glu Ile Val Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys

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

Lys Glu Lys Lys Val Pro Asp Asn Leu Ile Lys Ile Glu Glu Glu Glu  
370 375 380

Ser Asn Glu Ser Glu Ala Gly Thr Val Leu Lys Gln Ser Leu Pro Glu  
385 390 395 400

Gly Thr Thr Tyr Asp Leu Ser Lys Ala Thr Gln Ile Val Leu Thr Val  
405 410 415

Ala Lys Lys Ala Thr Thr Ile Gln Leu Gly Asn Tyr Ile Gly Arg Asn  
420 425 430

Ser Thr Glu Val Ile Ser Glu Leu Lys Gln Lys Lys Val Pro Glu Asn  
435 440 445

Leu Ile Lys Ile Glu Glu Glu Glu Ser Ser Glu Ser Glu Pro Gly Thr  
450 455 460

Ile Met Lys Gln Ser Pro Gly Ala Gly Thr Thr Tyr Asp Val Ser Lys  
465 470 475 480

Pro Thr Gln Ile Val Leu Thr Val Ala Lys Lys Val Thr Ser Val Ala  
485 490 495

Met Pro Ser Tyr Ile Gly Ser Ser Leu Glu Phe Thr Lys Asn Asn Leu  
500 505 510

Ile Gln Ile Val Gly Ile Lys Glu Ala Asn Ile Glu Val Val Glu Val  
515 520 525

Thr Thr Ala Pro Ala Gly Ser Val Glu Gly Met Val Val Glu Gln Ser  
530 535 540

Pro Arg Ala Gly Glu Lys Val Asp Leu Asn Lys Thr Arg Val Lys Ile  
545 550 555 560

Ser Ile Tyr Lys Pro Lys Thr Thr Ser Ala Thr Pro  
565 570

<210> 5  
<211> 572  
<212> PRT  
<213> Artificial

<220>  
<223> Construct 6 & 7: SP1732-3 + SP2216-1

<400> 5

Tyr Leu Ile Leu Leu Ala Ser Leu Val Leu Val Ala Ala Ser Leu Ile  
1 5 10 15

Trp Ile Leu Ser Arg Thr Pro Ala Thr Ile Ala Ile Pro Asp Val Ala  
20 25 30

Gly Gln Thr Val Ala Glu Ala Lys Ala Thr Leu Lys Lys Ala Asn Phe  
35 40 45

Glu Ile Gly Glu Glu Lys Thr Glu Ala Ser Glu Lys Val Glu Glu Gly  
50 55 60

Arg Ile Ile Arg Thr Asp Pro Gly Ala Gly Thr Gly Arg Lys Glu Gly  
65 70 75 80

Thr Lys Ile Asn Leu Val Val Ser Ser Gly Lys Gln Ser Phe Gln Ile  
85 90 95

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

Glu Lys Lys Val Pro Asp Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
115 120 125

Asn Glu Ser Glu Ala Gly Thr Val Leu Lys Gln Ser Leu Pro Glu Gly  
130 135 140

Thr Thr Tyr Asp Leu Ser Lys Ala Thr Gln Ile Val Leu Thr Val Ala  
145 150 155 160

Lys Lys Ala Thr Thr Ile Gln Leu Gly Asn Tyr Ile Gly Arg Asn Ser  
165 170 175

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

Ile Lys Ile Glu Glu Glu Glu Ser Ser Glu Ser Glu Pro Gly Thr Ile  
195 200 205

Met Lys Gln Ser Pro Gly Ala Gly Thr Thr Tyr Asp Val Ser Lys Pro  
210 215 220

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



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

Gln Ile Val Gly Ile Lys Glu Ala Asn Ile Glu Val Val Glu Val Thr  
260 265 270

Thr Ala Pro Ala Gly Ser Val Glu Gly Met Val Val Glu Gln Ser Pro  
275 280 285

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

Ile Tyr Lys Pro Lys Thr Thr Ser Ala Thr Pro Gly Pro Val Asp Pro  
305 310 315 320

Gly Glu Thr Thr Asp Asp Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser  
325 330 335

Asn Leu Thr Ala Gln Gln Gln Glu Ala Gln Lys Gln Val Asp Gln Ile  
340 345 350

Gln Glu Gln Val Ser Ala Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala  
355 360 365

Glu Asn Asp Arg Leu Gln Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile  
370 375 380

Thr Glu Leu Ser Lys Asn Ile Val Ser Arg Asn Gln Ser Leu Glu Lys  
385 390 395 400

Gln Ala Arg Ser Ala Gln Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn  
405 410 415

Thr Ile Val Asn Ser Lys Ser Ile Thr Glu Ala Ile Ser Arg Val Ala  
420 425 430

Ala Met Ser Glu Ile Val Ser Ala Asn Asn Lys Met Leu Glu Gln Gln  
435 440 445

Lys Ala Asp Lys Lys Ala Ile Ser Glu Lys Gln Val Ala Asn Asn Asp  
450 455 460

Ala Ile Asn Thr Val Ile Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala  
465 470 475 480

Gln Ala Leu Thr Thr Lys Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser  
485 490 495

Leu Ala Ala Glu Lys Ala Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu  
500 505 510

Glu Gln Lys Ala Ala Ala Glu Ala Glu Ala Arg Ala Ala Ala Val Ala  
515 520 525

Glu Ala Ala Tyr Lys Glu Lys Arg Ala Ser Gln Gln Gln Ser Val Leu  
530 535 540

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

Ser Ala Ala Ala Pro Val Arg Ala Lys Val Arg Pro  
565 570

<210> 6  
<211> 336  
<212> PRT  
<213> Artificial

<220>  
<223> Construct 8 & 9: SP2216-1 + SP1732-PASTA

<400> 6

Glu Thr Thr Asp Asp Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn  
1 5 10 15

Leu Thr Ala Gln Gln Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln  
20 25 30

Glu Gln Val Ser Ala Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu  
35 40 45

Asn Asp Arg Leu Gln Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr  
50 55 60

Glu Leu Ser Lys Asn Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln  
65 70 75 80

Ala Arg Ser Ala Gln Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn Thr  
85 90 95

Ile Val Asn Ser Lys Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala  
100 105 110

Met Ser Glu Ile Val Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys  
115 120 125

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

Ile Asn Thr Val Ile Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln  
145 150 155 160

Ala Leu Thr Thr Lys Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu  
165 170 175

Ala Ala Glu Lys Ala Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu  
180 185 190

Gln Lys Ala Ala Ala Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu  
195 200 205

Ala Ala Tyr Lys Glu Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala  
210 215 220

Ser Ala Asn Thr Asn Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser  
225 230 235 240

Ala Ala Ala Pro Val Arg Ala Lys Val Arg Pro Gly Gly Pro Gly Val  
245 250 255

Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu Glu Phe Thr  
260 265 270

Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala Asn Ile Glu  
275 280 285

Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu Gly Met Val  
290 295 300

Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu Asn Lys Thr  
305 310 315 320

Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser Ala Thr Pro  
325 330 335

<210> 7  
<211> 336  
<212> PRT

<213> Artificial

<220>

<223> Construct 10 & 11: SP1732- PASTA + SP2216-1

<400> 7

Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu Glu Phe  
1 5 10 15

Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala Asn Ile  
20 25 30

Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu Gly Met  
35 40 45

Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu Asn Lys  
50 55 60

Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser Ala Thr  
65 70 75 80

Pro Gly Gly Pro Gly Glu Thr Thr Asp Asp Lys Ile Ala Ala Gln Asp  
85 90 95

Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln Gln Glu Ala Gln Lys Gln  
100 105 110

Val Asp Gln Ile Gln Glu Gln Val Ser Ala Ile Gln Ala Glu Gln Ser  
115 120 125

Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln Ala Glu Ser Lys Lys Leu  
130 135 140

Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn Ile Val Ser Arg Asn Gln  
145 150 155 160

Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln Thr Asn Gly Ala Val Thr  
165 170 175

Ser Tyr Ile Asn Thr Ile Val Asn Ser Lys Ser Ile Thr Glu Ala Ile  
180 185 190

Ser Arg Val Ala Ala Met Ser Glu Ile Val Ser Ala Asn Asn Lys Met  
195 200 205

Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala Ile Ser Glu Lys Gln Val  
210 215 220

Ala Asn Asn Asp Ala Ile Asn Thr Val Ile Ala Asn Gln Gln Lys Leu  
225 230 235 240

Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys Gln Ala Glu Leu Lys Ala  
245 250 255

Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala Thr Ala Glu Gly Glu Lys  
260 265 270

Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala Glu Ala Glu Ala Arg Ala  
275 280 285

Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu Lys Arg Ala Ser Gln Gln  
290 295 300

Gln Ser Val Leu Ala Ser Ala Asn Thr Asn Leu Thr Ala Gln Val Gln  
305 310 315 320

Ala Val Ser Glu Ser Ala Ala Ala Pro Val Arg Ala Lys Val Arg Pro  
325 330 335

<210> 8  
<211> 753  
<212> DNA  
<213> Artificial

<220>  
<223> Construct 1: SP2216-1

<400> 8  
gaaacgactg atgacaaaat tgctgctcaa gataataaaa ttagtaactt aacagcacia 60  
caacaagaag cccaaaaaca agttgaccaa attcaggagc aagtatcagc tattcaagct 120  
gagcagtcta acttgcaagc tgaaaatgat agattacaag cagaatctaa gaaactcgag 180  
ggtgagatta cagaactttc taaaaacatt gtttctcgta accaatcggt ggaaaaacaa 240  
gctcgtagtg ctcaaacaaa tggagccgta actagctata tcaataccat tgtaaactca 300  
aatcaatta cagaagctat ttcacgtggt gctgcaatga gtgaaatcgt atctgcaaac 360  
aacaaaatgt tagaacaaca aaaggcagat aaaaaagcta tttctgaaaa acaagtagca 420  
aataatgatg ctatcaatac tgtaattgct aatcaacaaa aattggctga tgatgctcaa 480  
gcattgacta cgaaacaggc agaactaaaa gctgctgaat taagtcttgc tgctgagaaa 540  
gcgacagctg aaggggaaaa agcaagtcta ttagagcaaa aagcagcagc tgaggcagag 600  
gctcgtagcag ctgcggtagc agaagcagct tataaagaaa aacgagctag ccaacaacaa 660

tcagtacttg cttcagcaaa cactaactta acagctcaag tgcaagcagt atctgaatct	720
gcagcagcac ctgtccgtgc aaaagttcgt cca	753

<210> 9  
 <211> 945  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Construct 2: SP1732-3

<400> 9	
tacctgattt tgttggccag ccttgtattg gtggcagctt ctcttatttg gatactatcc	60
agaactcctg caaccattgc cattccagat gtggcaggtc agacagttgc agaggccaag	120
gcaacgctca aaaaagccaa ttttgagatt ggtgaggaga agacagaggc tagtgaaaag	180
gtggaagaag ggcggattat ccgtacagat cctggcgctg gaactggtcg aaaagaagga	240
acgaaaatca atttggttgt ctcacagggc aaacaatcct tccaaattag taattatgtc	300
ggccggaaat cttctgatgt tatcgcgga ttaaaagaga aaaaagttcc agataatttg	360
attaaaattg aggaagaaga gtcgaatgag agtgaggctg gaacggtcct gaagcaaagt	420
ctaccagaag gtacgaccta tgacttgagc aaggcaactc aaattgtttt gacagtagct	480
aaaaaagcta cgacgattca attaggaac tatattggac ggaactctac agaagtaatc	540
tcagaactca agcagaagaa ggttcctgag aatttgatta agatagagga agaagagtcc	600
agcgaaagcg aaccaggaac gattatgaaa caaagtccag gtgccggaac gacttatgat	660
gtgagtaaac ctactcaaat tgtcttgaca gtagctaaaa aagttacaag tgttgccatg	720
ccgagttaca ttggttccag cttggagttt actaagaaca atttgattca aattggtggg	780
attaaggaag ctaatataga agttgtagaa gtgacgacag cgcctgcagg tagtgtagaa	840
ggcatggttg ttgaacaaag tcctagagca ggtgaaaagg tagacctaaa taagactaga	900
gtcaagattt caatctacaa acctaaaaca acttcagcta ctcct	945

<210> 10  
 <211> 867  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Construct 3: SP1650 (PsaA)

<400> 10	
gctagcggaa aaaaagatac aacttctggt caaaaactaa aagttgttgc taaaaactca	60
atcatcgctg atattactaa aaatattgct ggtgacaaaa ttgaccttca tagtatcgtt	120
ccgattgggc aagaccaca cgaatacgaa ccacttctg aagacgttaa gaaaacttct	180

gaggctgatt tgattttcta taacggtatc aaccttgaaa caggtggcaa tgcttggttt	240
acaaaattgg tagaaaatgc caagaaaact gaaaacaaag actacttcgc agtcagcgac	300
ggcgttgatg ttatctacct tgaagggtcaa aatgaaaaag gaaaagaaga cccacacgct	360
tggtttaacc ttgaaaacgg tattattttt gctaaaaata tcgccaaaca attgagcgcc	420
aaagacccta acaataaaga attctatgaa aaaaatctca aagaatatac tgataagtta	480
gacaaacttg ataaagaaag taaggataaa ttttaataaga tccctgctga aaagaaactc	540
attgtaacca gcgaaggagc attcaaatac ttctctaaag cctatgggtg cccaagtgcc	600
tacatctggg aaatcaatac tgaagaagaa ggaactcctg aacaaatcaa gaccttggtt	660
gaaaaacttc gccaaacaaa agttccatca ctctttgtag aatcaagtgt ggatgaccgt	720
ccaatgaaaa ctgttttctca agacacaaac atcccaatct acgcacaaat ctttactgac	780
tctatcgag aacaaggtaa agaaggcgac agctactaca gcatgatgaa atacaacctt	840
gacaagattg ctgaaggatt ggcaaaa	867

<210> 11  
 <211> 1716  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Construct 4 & 5: SP2216-1 + SP1732-3

<400> 11	
gaaacgactg atgacaaaat tgctgctcaa gataataaaa ttagtaactt aacagcacia	60
caacaagaag cccaaaaaca agttgaccaa attcaggagc aagtatcagc tattcaagct	120
gagcagtcta acttgcaagc tgaaaatgat agattacaag cagaatctaa gaaactcgag	180
ggtgagatta cagaactttc taaaaacatt gtttctcgta accaatcggt ggaaaaacaa	240
gctcgtagtg ctcaaacaaa tggagccgta actagctata tcaataccat tgtaaactca	300
aatcaatta cagaagctat ttcacgtggt gctgcaatga gtgaaatcgt atctgcaaac	360
aacaaaatgt tagaacaaca aaaggcagat aaaaaagcta tttctgaaaa acaagtagca	420
aataatgatg ctatcaatac tgtaattgct aatcaacaaa aattggctga tgatgctcaa	480
gcattgacta cgaaacaggc agaactaaaa gctgctgaat taagtcttgc tgctgagaaa	540
gcgacagctg aaggggaaaa agcaagtcta ttagagcaaa aagcagcagc tgaggcagag	600
gctcgtgcag ctgcggtagc agaagcagct tataaagaaa aacgagctag ccaacaacaa	660
tcagtacttg cttcagcaaa cactaactta acagctcaag tgcaagcagt atctgaatct	720
gcagcagcac ctgtccgtgc aaaagttcgt ccaggaccag tcgaccctgg ttacctgatt	780

ttgttgGCCA gccttgTatt ggtggcagct tctcttattt ggatactatc cagaactcct	840
gcaaccattg ccattccaga tgtggcaggt cagacagttg cagaggccaa ggcaacgctc	900
aaaaaagcca attttgagat tggtagaggag aagacagagg ctagtgaaaa ggtggaagaa	960
gggCGgatta tccgtacaga tcctggcgct ggaactggtc gaaaagaagg aacgaaaatc	1020
aatttggttg tctcatcagg caaacaatcc ttccaaatta gtaattatgt cggccggaaa	1080
tcttctgatg ttatcgcgga attaaaagag aaaaaagttc cagataatth gattaaaatt	1140
gaggaagaag agtcgaatga gagtagaggct ggaacgggtcc tgaagcaaag tctaccagaa	1200
ggtacgacct atgacttgag caaggcaact caaattgttt tgacagtagc taaaaaagct	1260
acgacgattc aattagggaa ctatattgga cggaaactcta cagaagtaat ctcagaactc	1320
aagcagaaga aggttcctga gaatttgatt aagatagagg aagaagagtc cagcgaaaagc	1380
gaaccaggaa cgattatgaa acaaagtcca ggtgccggaa cgacttatga tgtgagtaaa	1440
cctactcaaa ttgtcttgac agtagctaaa aaagttacaa gtgttgccat gccgagttac	1500
attggttcca gcttgagatt tactaagaac aatttgattc aaattggttg gattaaggaa	1560
gctaatatag aagttgtaga agtgacgaca ggcctgcag gtagtgtaga aggcattggtt	1620
gttgaacaaa gtcctagagc aggtgaaaag gtagacctaa ataagactag agtcaagatt	1680
tcaatctaca aacctaaaac aacttcagct actcct	1716

<210> 12  
 <211> 1716  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Construct 6 & 7: SP1732-3 + SP2216-1

<400> 12	
tacctgattt tggtggccag ccttgatttg gtggcagctt ctcttatttg gatactatcc	60
agaactcctg caaccattgc cattccagat gtggcaggtc agacagttgc agaggccaag	120
gcaacgctca aaaaagccaa ttttgagatt ggtgaggaga agacagaggc tagtgaaaag	180
gtggaagaag ggcggattat ccgtacagat cctggcgctg gaactgggtc gaaagaagga	240
acgaaaatca atttggttgt ctcattcaggc aaacaatcct tccaaattag taattatgtc	300
ggccggaaat cttctgatgt tatcgcgga ttaaaagaga aaaaagttcc agataatttg	360
attaaaattg aggaagaaga gtcgaatgag agtgaggctg gaacggctct gaagcaaagt	420
ctaccagaag gtacgacctg tgacttgagc aaggcaactc aaattgtttt gacagtagct	480
aaaaaagcta cgacgattca attaggaac tatattggac ggaactctac agaagtaatc	540
tcagaactca agcagaagaa ggttcctgag aatttgatta agatagagga agaagagtcc	600



agcgaaagcg aaccaggaac gattatgaaa caaagtccag gtgccggaac gacttatgat	660
gtgagtaaac ctactcaaat tgtcttgaca gtagctaaaa aagttacaag tgttgccatg	720
ccgagttaca ttggttccag cttggagttt actaagaaca atttgattca aattggtggg	780
attaaggaag ctaatataga agttgtagaa gtgacgacag cgcctgcagg tagtgtagaa	840
ggcatggttg ttgaacaaag tcctagagca ggtgaaaagg tagacctaaa taagactaga	900
gtcaagatth caatctacaa acctaaaaca acttcagcta ctctggacc agtcgaccct	960
ggtgaaacga ctgatgacaa aattgctgct caagataata aaattagtaa cttacagca	1020
caacaacaag aagcccaaaa acaagttgac caaattcagg agcaagtatc agctattcaa	1080
gctgagcagt ctaacttgca agctgaaaat gatagattac aagcagaatc taagaaactc	1140
gagggtgaga ttacagaact ttctaaaaac attgtttctc gtaaccaatc gttggaaaaa	1200
caagctcgta gtgctcaaac aaatggagcc gtaactagct atatcaatac cattgtaaac	1260
tcaaaatcaa ttacagaagc tatttcacgt gttgctgcaa tgagtgaaat cgtatctgca	1320
aacaacaaaa tgttagaaca acaaaaggca gataaaaaag ctattttctga aaaacaagta	1380
gcaaataatg atgctatcaa tactgtaatt gctaatcaac aaaaattggc tgatgatgct	1440
caagcattga ctacgaaaca ggacagaacta aaagctgctg aattaagtct tgctgctgag	1500
aaagcgacag ctgaagggga aaaagcaagt ctattagagc aaaaagcagc agctgaggca	1560
gaggctcgtg cagctgcggt agcagaagca gcttataaag aaaaacgagc tagccaacaa	1620
caatcagtac ttgcttcagc aaacactaac ttaacagctc aagtgcagc agtatctgaa	1680
tctgcagcag cacctgtccg tgcaaaagtt cgtcca	1716

<210> 13  
 <211> 1008  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Construct 8 & 9: SP2216-1 + SP1732-PASTA

<400> 13	
gaaacgactg atgacaaaat tgctgctcaa gataataaaa ttagtaactt aacagcacia	60
caacaagaag cccaaaaaca agttgaccaa attcaggagc aagtatcagc tattcaagct	120
gagcagtcta acttgcaagc tgaaaatgat agattacaag cagaatctaa gaaactcgag	180
ggtgagatta cagaactttc taaaaacatt gtttctcgta accaatcggt ggaaaaacaa	240
gctcgtagtg ctcaaacaaa tggagccgta actagctata tcaataccat tgtaaaactca	300
aatcaatta cagaagctat ttcacgtggt gctgcaatga gtgaaatcgt atctgcaaac	360

aacaaaatgt tagaacaaca aaaggcagat aaaaaagcta tttctgaaaa acaagtagca	420
aataatgatg ctatcaatac tgtaattgct aatcaacaaa aattggctga tgatgctcaa	480
gcattgacta cgaaacaggc agaactaaaa gctgctgaat taagtcttgc tgctgagaaa	540
gcgacagctg aaggggaaaa agcaagtcta ttagagcaaa aagcagcagc tgaggcagag	600
gctcgtgcag ctgcggtagc agaagcagct tataaagaaa aacgagctag ccaacaacaa	660
tcagtacttg cttcagcaaa cactaactta acagctcaag tgcaagcagt atctgaatct	720
gcagcagcac ctgtccgtgc aaaagttcgt ccaggcggac ccgggggttac aagtgttgcc	780
atgccgagtt acattgggttc cagcttgag tttactaaga acaatttgat tcaaattggt	840
gggattaagg aagctaatat agaagttgta gaagtgcga cagcgctgc aggtagtgt	900
gaaggcatgg ttgttgaaca aagtcctaga gcaggtgaaa aggtagacct aaataagact	960
agagtcaaga tttcaatcta caaacctaaa acaacttcag ctactcct	1008

<210> 14  
 <211> 1008  
 <212> DNA  
 <213> Artificial

<220>  
 <223> Construct 10 & 11: SP1732- PASTA + SP2216-1

<400> 14	
gttacaagtg ttgccatgcc gagttacatt ggttccagct tggagtttac taagaacaat	60
ttgattcaaa ttgttgggat taaggaaagct aatatagaag ttgtagaagt gacgacagcg	120
cctgcaggta gtgtagaagg catggttggt gaacaaagtc ctagagcagg tgaaaaggta	180
gacctaaata agactagagt caagatttca atctacaaac ctaaaacaac ttcagctact	240
cctggcggac ccggggaaac gactgatgac aaaattgctg ctcaagataa taaaattagt	300
aacttaacag cacaacaaca agaagcccaa aaacaagttg accaaattca ggagcaagta	360
tcagctattc aagctgagca gtctaacttg caagctgaaa atgatagatt acaagcagaa	420
tctaagaaac tcgaggggtga gattacagaa ctttctaaaa acattgtttc tcgtaaccaa	480
tcgttggaat aacaagctcg tagtgctcaa acaaattggag ccgtaactag ctatatcaat	540
accattgtaa actcaaaatc aattacagaa gctattttcac gtgttgctgc aatgagtga	600
atcgtatctg caaacaacaa aatgtagaa caacaaaagg cagataaaaa agctatttct	660
gaaaaacaag tagcaaataa tgatgctatc aatactgtaa ttgctaatac acaaaaattg	720
gctgatgatg ctcaagcatt gactacgaaa caggcagaac taaaagctgc tgaattaagt	780
cttgctgctg agaaagcgac agctgaaggg gaaaaagcaa gtctattaga gcaaaaagca	840
gcagctgagg cagaggctcg tgcagctgcg gtagcagaag cagcttataa agaaaaacga	900

gctagccaac aacaatcagt acttgcttca gcaaacta acttaacagc tcaagtgcaa 960  
gcagtatctg aatctgcagc agcacctgtc cgtgcaaaag ttcgtcca 1008

<210> 15  
<211> 251  
<212> PRT  
<213> artificial

<220>  
<223> Consensus SP2216-1

<400> 15

Glu Thr Thr Asp Asp Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn  
1 5 10 15

Leu Thr Ala Gln Gln Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln  
20 25 30

Glu Gln Val Ser Ala Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu  
35 40 45

Asn Asp Arg Leu Gln Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr  
50 55 60

Glu Leu Ser Lys Asn Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln  
65 70 75 80

Ala Arg Ser Ala Gln Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn Thr  
85 90 95

Ile Val Asn Ser Lys Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala  
100 105 110

Met Ser Glu Ile Val Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys  
115 120 125

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

Ile Asn Thr Val Ile Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln  
145 150 155 160

Ala Leu Thr Thr Lys Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu  
165 170 175

Ala Ala Glu Lys Ala Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu

180                                      185                                      190  
 Gln Lys Ala Ala Ala Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu  
           195                                      200                                      205  
 Ala Ala Tyr Lys Glu Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala  
           210                                      215                                      220  
 Ser Ala Asn Thr Asn Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser  
 225                                      230                                      235                                      240  
 Ala Ala Ala Pro Val Arg Ala Lys Val Arg Pro  
                                     245                                      250

<210> 16  
 <211> 315  
 <212> PRT  
 <213> Artificial

<220>  
 <223> Consensus SP1732-3

<220>  
 <221> MISC\_FEATURE  
 <222> (156)..(156)  
 <223> Xaa = Val or Ile

<220>  
 <221> MISC\_FEATURE  
 <222> (279)..(279)  
 <223> Xaa = Ala or Val

<400> 16

Tyr Leu Ile Leu Leu Ala Ser Leu Val Leu Val Ala Ala Ser Leu Ile  
 1                                      5                                      10                                      15

Trp Ile Leu Ser Arg Thr Pro Ala Thr Ile Ala Ile Pro Asp Val Ala  
           20                                      25                                      30

Gly Gln Thr Val Ala Glu Ala Lys Ala Thr Leu Lys Lys Ala Asn Phe  
           35                                      40                                      45

Glu Ile Gly Glu Glu Lys Thr Glu Ala Ser Glu Lys Val Glu Glu Gly  
           50                                      55                                      60

Arg Ile Ile Arg Thr Asp Pro Gly Ala Gly Thr Gly Arg Lys Glu Gly  
 65                                      70                                      75                                      80

Thr Lys Ile Asn Leu Val Val Ser Ser Gly Lys Gln Ser Phe Gln Ile

85

90

95

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

Glu Lys Lys Val Pro Asp Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 115 120 125

Asn Glu Ser Glu Ala Gly Thr Val Leu Lys Gln Ser Leu Pro Glu Gly  
 130 135 140

Thr Thr Tyr Asp Leu Ser Lys Ala Thr Gln Ile Xaa Leu Thr Val Ala  
 145 150 155 160

Lys Lys Ala Thr Thr Ile Gln Leu Gly Asn Tyr Ile Gly Arg Asn Ser  
 165 170 175

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

Ile Lys Ile Glu Glu Glu Glu Ser Ser Glu Ser Glu Pro Gly Thr Ile  
 195 200 205

Met Lys Gln Ser Pro Gly Ala Gly Thr Thr Tyr Asp Val Ser Lys Pro  
 210 215 220

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

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

Gln Ile Val Gly Ile Lys Glu Ala Asn Ile Glu Val Val Glu Val Thr  
 260 265 270

Thr Ala Pro Ala Gly Ser Xaa Glu Gly Met Val Val Glu Gln Ser Pro  
 275 280 285

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

Ile Tyr Lys Pro Lys Thr Thr Ser Ala Thr Pro  
 305 310 315

<210> 17

<211> 289

<212> PRT  
<213> Artificial

<220>  
<223> Consensus PsaA

<220>  
<221> MISC\_FEATURE  
<222> (7)..(7)  
<223> Xaa = Thr or Ala

<220>  
<221> MISC\_FEATURE  
<222> (8)..(8)  
<223> Xaa = Thr or Ala

<220>  
<221> MISC\_FEATURE  
<222> (10)..(10)  
<223> Xaa = Gly or Ser

<220>  
<221> MISC\_FEATURE  
<222> (63)..(63)  
<223> Xaa = Asp or Asn

<220>  
<221> MISC\_FEATURE  
<222> (100)..(100)  
<223> Xaa = Asp or Glu

<220>  
<221> MISC\_FEATURE  
<222> (110)..(110)  
<223> Xaa = Gln or Lys

<220>  
<221> MISC\_FEATURE  
<222> (173)..(173)  
<223> Xaa = Lys or Asn

<220>  
<221> MISC\_FEATURE  
<222> (265)..(265)  
<223> Xaa = Gln or Glu

<220>  
<221> MISC\_FEATURE  
<222> (285)..(285)  
<223> Xaa = Glu or Gly

<400> 17

Ala Ser Gly Lys Lys Asp Xaa Xaa Ser Xaa Gln Lys Leu Lys Val Val  
1 5 10 15

Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn Ile Ala Gly Asp  
20 25 30

Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln Asp Pro His Glu  
35 40 45

Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser Glu Ala Xaa Leu  
50 55 60

Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly Asn Ala Trp Phe  
65 70 75 80

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

Ala Val Ser Xaa Gly Val Asp Val Ile Tyr Leu Glu Gly Xaa Asn Glu  
100 105 110

Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu Glu Asn Gly Ile  
115 120 125

Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala Lys Asp Pro Asn  
130 135 140

Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr Thr Asp Lys Leu  
145 150 155 160

Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn Xaa Ile Pro Ala  
165 170 175

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

Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu Ile Asn Thr Glu  
195 200 205

Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val Glu Lys Leu Arg  
210 215 220

Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser Val Asp Asp Arg  
225 230 235 240

Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro Ile Tyr Ala Gln  
245 250 255

Ile Phe Thr Asp Ser Ile Ala Glu Xaa Gly Lys Glu Gly Asp Ser Tyr  
260 265 270

Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala Xaa Gly Leu Ala  
275 280 285

Lys

<210> 18  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 3 (serotype 3)

<400> 18

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asn Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190



Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 19  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 11 (serotype 7F)  
<400> 19

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn

					245					250						255
Leu	Thr	Ala	Gln	Val	Gln	Ala	Val	Tyr	Glu	Ser	Ala	Ala	Ala	Pro	Val	
			260					265					270			
Arg	Ala	Lys	Val	Arg	Pro	Thr	Tyr	Ser	Thr	Asn	Ala	Ser	Ser	Tyr	Pro	
		275					280					285				
Ile	Gly	Glu	Cys	Thr	Trp	Gly	Val	Lys	Thr	Leu	Ala	Pro	Trp	Ala	Gly	
	290					295					300					
Asp	Tyr	Trp	Gly	Asn	Gly	Ala	Gln	Trp	Ala	Thr	Ser	Ala	Ala	Ala	Ala	
305					310					315					320	
Gly	Phe	Arg	Thr	Gly	Ser	Thr	Pro	Gln	Val	Gly	Ala	Ile	Ala	Cys	Trp	
				325					330					335		
Asn	Asp	Gly	Gly	Tyr	Gly	His	Val	Ala	Val	Val	Thr	Ala	Val	Glu	Ser	
			340					345					350			
Thr	Thr	Arg	Ile	Gln	Val	Ser	Glu	Ser	Asn	Tyr	Ala	Gly	Asn	Arg	Thr	
		355					360					365				
Ile	Gly	Asn	His	Arg	Gly	Trp	Phe	Asn	Pro	Thr	Thr	Thr	Ser	Glu	Gly	
	370					375					380					
Phe	Val	Thr	Tyr	Ile	Tyr	Ala	Asp									
385					390											
<210>	20															
<211>	392															
<212>	PRT															
<213>	Streptococcus pneumoniae CDC 24 (serotype 11D)															
<400>	20															
Met	Lys	Lys	Lys	Ile	Leu	Ala	Ser	Leu	Leu	Leu	Ser	Thr	Val	Met	Val	
1				5					10					15		
Ser	Gln	Val	Ala	Val	Leu	Thr	Thr	Ala	His	Ala	Glu	Thr	Thr	Asp	Asp	
			20					25					30			
Lys	Ile	Ala	Ala	Gln	Asp	Asn	Lys	Ile	Ser	Asn	Leu	Thr	Ala	Gln	Gln	
		35					40					45				
Gln	Glu	Ala	Gln	Lys	Gln	Val	Asp	Gln	Ile	Gln	Glu	Gln	Val	Ser	Ala	
	50					55					60					

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Ser Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 21  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 25 (serotype 11F)  
  
<400> 21

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Val Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 22  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 27 (serotype 12B)

<400> 22

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Ser Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys

180		185		190
Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala	195	200	205	
Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala	210	215	220	
Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu	225	230	235	240
Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn	245	250	255	
Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val	260	265	270	
Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro	275	280	285	
Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly	290	295	300	
Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala	305	310	315	320
Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp	325	330	335	
Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser	340	345	350	
Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr	355	360	365	
Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly	370	375	380	
Phe Val Thr Tyr Ile Tyr Ala Asp	385	390		

<210> 23  
 <211> 392  
 <212> PRT  
 <213> Streptococcus pneumoniae CDC 49 (serotype 22A)  
 <400> 23



Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Arg Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 24  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 56 (serotype 24F)  
  
<400> 24

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Ile Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 25  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 61 (serotype 28F)  
<400> 25

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

Thr Asn Gly Ala Val Thr Ser Tyr Ile Asn Thr Ile Val Asn Ser Lys

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

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 26  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 97 (serotype 19A)

<400> 26

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Gly Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 27

<211> 391

<212> PRT

<213> Streptococcus pneumoniae CDC 103 (serotype 19A)

<400> 27

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Ser Leu Ala Ala Glu Lys Ala Thr  
195 200 205

Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala Glu  
210 215 220

Ala Glu Ala Arg Ala Ala Ala Ala Ala Glu Ala Ala Tyr Lys Glu Lys  
225 230 235 240



Gln Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Gly Asn Thr Asn Leu  
245 250 255

Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Val Ala Pro Val Gln  
260 265 270

Ala Lys Val Arg Pro Thr Tyr Asn Thr Asp Ala Ser Thr Tyr Pro Ile  
275 280 285

Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly Asp  
290 295 300

Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Gly  
305 310 315 320

Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp Asn  
325 330 335

Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser Thr  
340 345 350

Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr Ile  
355 360 365

Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly Phe  
370 375 380

Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 28

<211> 392

<212> PRT

<213> Streptococcus pneumoniae CDC 106 (serotype 23F)

<400> 28

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala

50

55

60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ser Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 29  
<211> 392  
<212> PRT  
<213> Streptococcus pneumoniae CDC 112 (serotype 6B)  
<400> 29

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ala Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Tyr Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr

355

360

365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
 370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
 385 390

&lt;210&gt; 30

&lt;211&gt; 392

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae PJ-1280\_10A (serotype 10A)

&lt;400&gt; 30

Met Lys Lys Lys Ile Leu Ala Ser Leu Leu Leu Ser Thr Val Met Val  
 1 5 10 15

Ser Gln Val Ala Val Leu Thr Thr Ala His Ala Glu Thr Thr Asp Asp  
 20 25 30

Lys Ile Ala Ala Gln Asp Asn Lys Ile Ser Asn Leu Thr Ala Gln Gln  
 35 40 45

Gln Glu Ala Gln Lys Gln Val Asp Gln Ile Gln Glu Gln Val Ser Ala  
 50 55 60

Ile Gln Ala Glu Gln Ser Asn Leu Gln Ala Glu Asn Asp Arg Leu Gln  
 65 70 75 80

Ala Glu Ser Lys Lys Leu Glu Gly Glu Ile Thr Glu Leu Ser Lys Asn  
 85 90 95

Ile Val Ser Arg Asn Gln Ser Leu Glu Lys Gln Ala Arg Ser Ala Gln  
 100 105 110

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

Ser Ile Thr Glu Ala Ile Ser Arg Val Ala Ala Met Ser Glu Ile Val  
 130 135 140

Ser Ala Asn Asn Lys Met Leu Glu Gln Gln Lys Ala Asp Lys Lys Ala  
 145 150 155 160

Ile Ser Glu Lys Gln Val Ala Asn Asn Asp Ala Ile Asn Thr Val Ile  
 165 170 175

Ala Asn Gln Gln Lys Leu Ala Asp Asp Ala Gln Ala Leu Thr Thr Lys  
180 185 190

Gln Ala Glu Leu Lys Ala Ala Glu Leu Ser Leu Ala Ala Glu Lys Ala  
195 200 205

Thr Ala Glu Gly Glu Lys Ala Ser Leu Leu Glu Gln Lys Ala Ala Ala  
210 215 220

Glu Ala Glu Ala Arg Ala Ala Ala Val Ala Glu Ala Ala Tyr Lys Glu  
225 230 235 240

Lys Arg Ser Ser Gln Gln Gln Ser Val Leu Ala Ser Ala Asn Thr Asn  
245 250 255

Leu Thr Ala Gln Val Gln Ala Val Ser Glu Ser Ala Ala Ala Pro Val  
260 265 270

Arg Ala Lys Val Arg Pro Thr Tyr Ser Thr Asn Ala Ser Ser Tyr Pro  
275 280 285

Ile Gly Glu Cys Thr Trp Gly Val Lys Thr Leu Ala Pro Trp Ala Gly  
290 295 300

Asp Tyr Trp Gly Asn Gly Ala Gln Trp Ala Thr Ser Ala Ala Ala Ala  
305 310 315 320

Gly Phe Arg Thr Gly Ser Thr Pro Gln Val Gly Ala Ile Ala Cys Trp  
325 330 335

Asn Asp Gly Gly Tyr Gly His Val Ala Val Val Thr Ala Val Glu Ser  
340 345 350

Thr Thr Arg Ile Gln Val Ser Glu Ser Asn Tyr Ala Gly Asn Arg Thr  
355 360 365

Ile Gly Asn His Arg Gly Trp Phe Asn Pro Thr Thr Thr Ser Glu Gly  
370 375 380

Phe Val Thr Tyr Ile Tyr Ala Asp  
385 390

<210> 31  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 1 (serotype 1)

<400> 31

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480



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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 32  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 2 (serotype 2)

<400> 32

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu

20

25

30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 33  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 3 (serotype 3)

<400> 33

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala

50

55

60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ser Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
450 455 460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 34  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 4 (serotype 4)

<400> 34

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu

85

90

95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335



Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ser Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
450 455 460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 35  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 5 (serotype 5)

<400> 35

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His

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

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Thr Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 36  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 8 (serotype 7A)

<400> 36

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala

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

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 37  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 11 (serotype 7F)

<400> 37

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln



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

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 38  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 13 (serotype 9A)

<400> 38

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His

210

215

220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 39  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 16 (serotype 9V)  
  
<400> 39

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 40  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 17 (serotype 10A)

<400> 40

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30



Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

Leu Ser Tyr Asn Arg Arg Asn Glu Ser Lys Leu Ile Phe Asp Glu Thr

275

280

285

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Thr Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 41  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 18 (serotype 10B)

<400> 41

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys

305		310		315		320									
Asn	Pro	Ser	Gln	Ala	Val	Thr	Glu	Glu	Thr	Tyr	Gln	Pro	Gln	Ala	Pro
			325						330					335	
Lys	Lys	His	Arg	Phe	Lys	Met	Arg	Tyr	Leu	Ile	Leu	Leu	Ala	Ser	Leu
			340					345					350		
Val	Leu	Val	Ala	Ala	Ser	Leu	Ile	Trp	Ile	Leu	Ser	Arg	Thr	Pro	Ala
		355					360					365			
Thr	Ile	Ala	Ile	Pro	Asp	Val	Ala	Gly	Gln	Thr	Val	Ala	Glu	Ala	Lys
	370					375					380				
Ala	Thr	Leu	Lys	Lys	Ala	Asn	Phe	Glu	Ile	Gly	Glu	Glu	Lys	Thr	Glu
385					390					395					400
Ala	Ser	Glu	Lys	Val	Glu	Glu	Gly	Arg	Ile	Ile	Arg	Thr	Asp	Pro	Gly
				405					410					415	
Ala	Gly	Thr	Gly	Arg	Lys	Glu	Gly	Thr	Lys	Ile	Asn	Leu	Val	Val	Ser
			420					425					430		
Ser	Gly	Lys	Gln	Ser	Phe	Gln	Ile	Ser	Asn	Tyr	Val	Gly	Arg	Lys	Ser
		435					440					445			
Ser	Asp	Val	Ile	Ala	Glu	Leu	Lys	Glu	Lys	Lys	Val	Pro	Asp	Asn	Leu
	450					455					460				
Ile	Lys	Ile	Glu	Glu	Glu	Glu	Ser	Asn	Glu	Ser	Glu	Ala	Gly	Thr	Val
465					470					475					480
Leu	Lys	Gln	Ser	Leu	Pro	Glu	Gly	Thr	Thr	Tyr	Asp	Leu	Ser	Lys	Ala
				485					490					495	
Thr	Gln	Ile	Val	Leu	Thr	Val	Ala	Lys	Lys	Ala	Thr	Thr	Ile	Gln	Leu
			500					505					510		
Gly	Asn	Tyr	Ile	Gly	Arg	Asn	Ser	Thr	Glu	Val	Ile	Ser	Glu	Leu	Lys
		515					520					525			
Gln	Lys	Lys	Val	Pro	Glu	Asn	Leu	Ile	Lys	Ile	Glu	Glu	Glu	Glu	Ser
	530					535					540				
Ser	Glu	Ser	Glu	Pro	Gly	Thr	Ile	Met	Lys	Gln	Ser	Pro	Gly	Ala	Gly
545					550					555					560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 42  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 19 (serotype 10C)

<400> 42

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Ala Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Phe Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu

340	345	350
Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala		
355	360	365
Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys		
370	375	380
Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu		
385	390	395
Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly		
405	410	415
Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser		
420	425	430
Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser		
435	440	445
Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu		
450	455	460
Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val		
465	470	475
Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala		
485	490	495
Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu		
500	505	510
Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys		
515	520	525
Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser		
530	535	540
Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly		
545	550	555
Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala		
565	570	575
Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu		
580	585	590



Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 43  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 20 (serotype 10F)

<400> 43

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys

370

375

380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 44  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 22 (serotype 11B)

<400> 44

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly

				405				410				415			
Ala	Gly	Thr	Gly	Arg	Lys	Glu	Gly	Thr	Lys	Ile	Asn	Leu	Val	Val	Ser
			420				425						430		
Ser	Gly	Lys	Gln	Ser	Phe	Gln	Ile	Ser	Asn	Tyr	Val	Gly	Arg	Lys	Ser
			435				440						445		
Ser	Asp	Val	Ile	Ala	Glu	Leu	Lys	Glu	Lys	Lys	Val	Pro	Asp	Asn	Leu
			450				455						460		
Ile	Lys	Ile	Glu	Glu	Glu	Glu	Ser	Asn	Glu	Ser	Glu	Ala	Gly	Thr	Val
465				470						475			480		
Leu	Lys	Gln	Ser	Leu	Pro	Glu	Gly	Thr	Thr	Tyr	Asp	Leu	Ser	Lys	Ala
			485				490						495		
Thr	Gln	Ile	Val	Leu	Thr	Val	Ala	Lys	Lys	Ala	Thr	Thr	Ile	Gln	Leu
			500				505						510		
Gly	Asn	Tyr	Ile	Gly	Arg	Asn	Ser	Thr	Glu	Val	Ile	Ser	Glu	Leu	Lys
			515				520						525		
Gln	Lys	Lys	Val	Pro	Glu	Asn	Leu	Ile	Lys	Ile	Glu	Glu	Glu	Glu	Ser
			530				535						540		
Ser	Glu	Ser	Glu	Pro	Gly	Thr	Ile	Met	Lys	Gln	Ser	Pro	Gly	Ala	Gly
545				550						555			560		
Thr	Thr	Tyr	Asp	Val	Ser	Lys	Pro	Thr	Gln	Ile	Val	Leu	Thr	Val	Ala
			565				570						575		
Lys	Lys	Val	Thr	Ser	Val	Ala	Met	Pro	Ser	Tyr	Ile	Gly	Ser	Ser	Leu
			580				585						590		
Glu	Phe	Thr	Lys	Asn	Asn	Leu	Ile	Gln	Ile	Val	Gly	Ile	Lys	Glu	Ala
			595				600						605		
Asn	Ile	Glu	Val	Val	Glu	Val	Thr	Thr	Ala	Pro	Ala	Gly	Ser	Val	Glu
			610				615						620		
Gly	Met	Val	Val	Glu	Gln	Ser	Pro	Arg	Ala	Gly	Glu	Lys	Val	Asp	Leu
625				630						635			640		
Asn	Lys	Thr	Arg	Val	Lys	Ile	Ser	Ile	Tyr	Lys	Pro	Lys	Thr	Thr	Ser
			645				650						655		

Ala Thr Pro

<210> 45  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 23 (serotype 11C)  
  
<400> 45

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser



435

440

445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 46

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 25 (serotype 11F)

<400> 46

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val

465                      470                      475                      480  
 Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala  
                                  485                      490                      495  
 Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
                                  500                      505                      510  
 Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
                                  515                      520                      525  
 Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
                                  530                      535                      540  
 Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545                                   550                      555                      560  
 Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala  
                                  565                      570                      575  
 Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
                                  580                      585                      590  
 Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
                                  595                      600                      605  
 Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
                                  610                      615                      620  
 Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625                                   630                      635                      640  
 Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
                                  645                      650                      655  
 Ala Thr Pro

<210> 47  
 <211> 659  
 <212> PRT  
 <213> Streptococcus pneumoniae CDC 26 (serotype 12A)  
 <400> 47

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1                      5                      10                      15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln His Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu



Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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



Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser

530

535

540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 49

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 33 (serotype 15C)

<400> 49

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala

565

570

575

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Leu Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 50

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 34 (serotype 15F)

<400> 50

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala

595

600

605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 51

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 37 (serotype 17A)

<400> 51

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140



Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu

625                                  630                                  635                                  640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
                                645                                  650                                  655

Ala Thr Pro

<210> 52  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 38 (serotype 17F)

<400> 52

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1                                  5                                  10                                  15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
                                20                                  25                                  30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
                                35                                  40                                  45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50                                  55                                  60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65                                  70                                  75                                  80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
                                85                                  90                                  95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
                                100                                  105                                  110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
                                115                                  120                                  125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130                                  135                                  140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145                                  150                                  155                                  160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
                                165                                  170                                  175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 53  
 <211> 659  
 <212> PRT  
 <213> Streptococcus pneumoniae CDC 39 (serotype 18A)  
 <400> 53

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 54

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 41 (serotype 18C)



<400> 54

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 55  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 42 (serotype 18F)

<400> 55

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 56  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 49 (serotype 22A)

<400> 56

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Glu Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540



Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 57  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 50 (serotype 22F)

<400> 57

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 58  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 53 (serotype 23F)

<400> 58

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 59  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 55 (serotype 24B)  
  
<400> 59

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Lys  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400



Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 60

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 57 (serotype 25A)

<400> 60

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 61  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 58 (serotype 25F)

<400> 61

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Ala Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 62

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 60 (serotype 28A)

<400> 62

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys

1	5	10	15
Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu	20	25	30
Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr	35	40	45
Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala	50	55	60
Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly	65	70	75
Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu	85	90	95
Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu	100	105	110
Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His	115	120	125
Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu	130	135	140
Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala	145	150	155
Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val	165	170	175
His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln	180	185	190
Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly	195	200	205
His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His	210	215	220
Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro	225	230	235
Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr	245	250	255



Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Thr Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Asn Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 63  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 62 (serotype 29)

<400> 63

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr

35

40

45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 64

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 65 (serotype 32F)

<400> 64

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly

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

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 65

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 66 (serotype 33A)

<400> 65

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu



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

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Ala Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 66  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 67 (serotype 33B)  
  
<400> 66

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu

130

135

140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 67  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 68 (serotype 33C)  
  
<400> 67

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val

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

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Asn Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655



Ala Thr Pro

<210> 68

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 69 (serotype 33D)

<400> 68

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly

195

200

205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Lys Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 69  
<211> 659  
<212> PRT

<213> Streptococcus pneumoniae CDC 70 (serotype 33F)

<400> 69

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

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

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

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Ala Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 70  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 71 (serotype 34)

<400> 70

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser

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



Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 71  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 74 (serotype 35C)

<400> 71

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu

290

295

300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 72  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 76 (serotype 36)

<400> 72

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Val Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro

325

330

335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 73  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 77 (serotype 37)

<400> 73

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala



355

360

365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Ala Leu Ser Lys Ala  
 485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Ile  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 74  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 78 (serotype 38)  
  
<400> 74

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Ile Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu

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

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 75  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 80 (serotype 40)

<400> 75

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser

420		425		430
Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser	435	440		445
Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu	450	455		460
Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val	465	470		475
Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala	485	490		495
Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu	500	505		510
Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys	515	520		525
Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser	530	535		540
Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly	545	550		555
Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala	565	570		575
Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu	580	585		590
Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala	595	600		605
Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu	610	615		620
Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu	625	630		635
Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser	645	650		655
Ala Thr Pro				

<210> 76  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 81 (serotype 41A)

<400> 76

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205



His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Ala Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu

450

455

460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Asn Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 77

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 83 (serotype 42)

<400> 77

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala

485

490

495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 78

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 84 (serotype 43)

<400> 78

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Glu Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys

515

520

525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 79

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 86 (serotype 45)

<400> 79

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60



Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ile  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly

545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 80  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 89 (serotype 47F)

<400> 80

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Ser Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Ala Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Asn Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu

580		585		590
Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala	595	600	605	
Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu	610	615	620	
Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu	625	630	635	640
Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser	645	650	655	

Ala Thr Pro

<210> 81  
 <211> 658  
 <212> PRT  
 <213> Streptococcus pneumoniae CDC 93 (serotype 9V)

<400> 81

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys	1	5	10	15
Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu	20	25	30	
Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr	35	40	45	
Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala	50	55	60	
Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly	65	70	75	80
Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu	85	90	95	
Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu	100	105	110	
Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His	115	120	125	

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Leu Gln His Phe  
210 215 220

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

Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr Asn  
245 250 255

Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser Leu  
260 265 270

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

Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu Thr  
290 295 300

Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys Asn  
305 310 315 320

Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro Lys  
325 330 335

Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu Val  
340 345 350

Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala Thr  
355 360 365

Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys Ala  
370 375 380

Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu Ala  
385 390 395 400

Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly Ala  
405 410 415

Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser Ser  
420 425 430

Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser Ser  
435 440 445

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

Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val Leu  
465 470 475 480

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

Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu Gly  
500 505 510

Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys Gln  
515 520 525

Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser Ser  
530 535 540

Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly Thr  
545 550 555 560

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

Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu Glu  
580 585 590

Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala Asn  
595 600 605

Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu Gly



610

615

620

Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu Asn  
 625 630 635 640

Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser Ala  
 645 650 655

Thr Pro

<210> 82

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 95 (serotype 14)

<400> 82

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser

645

650

655

Ala Thr Pro

&lt;210&gt; 83

&lt;211&gt; 659

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae CDC 100 (serotype 14)

&lt;400&gt; 83

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 103 (serotype 19A)

<400> 84

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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



Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 85  
 <211> 659  
 <212> PRT  
 <213> Streptococcus pneumoniae CDC 104 (serotype 19F)

<400> 85

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 86  
<211> 658  
<212> PRT  
<213> Streptococcus pneumoniae CDC 108 (serotype 14)

<400> 86

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val Leu  
465 470 475 480

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

Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu Gly  
500 505 510

Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys Gln  
515 520 525

Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser Ser  
530 535 540

Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly Thr  
545 550 555 560

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

Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu Glu  
580 585 590

Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala Asn  
595 600 605

Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu Gly  
610 615 620

Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu Asn  
625 630 635 640

Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser Ala  
645 650 655

Thr Pro

<210> 87  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 109 (serotype 5)

<400> 87

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320



Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 88  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 110 (serotype 6B)  
  
<400> 88

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 89

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 111 (serotype 19F)

<400> 89

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 90  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 112 (serotype 6B)  
  
<400> 90

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175



His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 91  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae CDC 113 (serotype 6A)

<400> 91

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 92

<211> 659

<212> PRT

<213> Streptococcus pneumoniae CDC 115 (serotype 15A)

<400> 92

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 93

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1293\_1 (serotype 1)

<400> 93

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu



20

25

30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 94  
<211> 644  
<212> PRT  
<213> Streptococcus pneumoniae I-33\_3 (serotype 3)

<400> 94

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala

50

55

60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Phe Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Val Ile Lys Ala Thr Ala Lys Lys Leu Ser  
245 250 255

Asp Arg Tyr Gln Ser Val Ser Glu Met Tyr Val Asp Leu Ser Thr Ser  
260 265 270

Leu Ser Tyr Asn Arg Arg Asn Glu Pro Lys Leu Val Phe Asp Asp Ala  
275 280 285

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Pro Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Pro Ala Gln Glu Glu Arg Pro Gln Pro Lys  
305 310 315 320

Lys Pro Thr Gln Pro Val Ala Glu Pro Ala Pro Ala Pro Lys Pro Ala  
325 330 335

Lys Lys Arg Lys Phe Lys Ala Arg Tyr Met Ile Leu Leu Ala Ser Leu  
340 345 350

Leu Leu Val Ala Ala Ser Leu Val Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Glu Ala Leu Lys Lys Ser Lys Phe Glu Ala Gly Glu Glu Lys Ser Glu  
385 390 395 400

Ala Ser Asp Thr Val Ala Glu Gly Arg Val Ile Arg Thr Asp Pro Glu  
405 410 415

Ala Gly Ser Gly Arg Lys Glu Gly Thr Lys Val Asn Leu Ile Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Leu Ser Asn Tyr Val Gly Arg Lys Tyr  
435 440 445

Thr Asp Val Val Ala Glu Leu Lys Glu Lys Lys Val Pro Glu Asn Leu  
450 455 460

Ile Lys Met Glu Glu Glu Glu Ser Ser Glu Ser Glu Pro Gly Thr Val  
465 470 475 480

Leu Arg Gln Thr Pro Ala Ser Gly Ser Thr Tyr Asp Leu Ser Lys Ala  
485 490 495

Thr Thr Ile Thr Leu Thr Val Ala Lys Lys Val Thr Ser Val Ser Met  
500 505 510

Pro Asn Tyr Ile Gly Ser Ser Leu Glu Phe Thr Lys Asn Asn Leu Thr  
515 520 525

Gln Ile Val Gly Val Lys Glu Ala Asn Ile Glu Val Val Glu Val Ser  
530 535 540

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

Arg Ala Gly Glu Leu Val Asp Leu Ala Ser Thr Arg Ile Lys Leu Ser  
565 570 575

Ile Tyr Lys Pro Lys Thr Pro Pro Ser Thr Ser Ser Ser Asn Pro Ala  
580 585 590

Gln Arg Gly Asn Gln Gly Ser Pro Thr Ser Pro Thr Gln Gly Asn Gln  
595 600 605

Gln Gly Asn Gln Gln Gly Asn Gln Gln Gly Asn Asn Pro Pro Thr Asn  
610 615 620

Gln Pro Val Arg Arg Phe Val Cys Tyr Thr Pro Glu Gln Cys Ser Ala  
625 630 635 640

Arg Asp Met Ser

<210> 95

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1319\_4 (serotype 4)

<400> 95

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu

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

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ser Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
450 455 460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590



Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 96

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1321\_4 (serotype 4)

<400> 96

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

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

His Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala His Leu Asn His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu

130

135

140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Ile Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 97

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1241\_6A (serotype 6A)

<400> 97

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val

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

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Val Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 98

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1296\_7F (serotype 7F)

<400> 98

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Val Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly

195																			
His	Ile	Pro	Tyr	Asp	Gly	Asp	Ser	Ala	Val	Thr	Ile	Ala	Leu	Gln	His				
210						215					220								
Phe	Gln	Lys	Pro	Leu	Pro	Ser	Val	Ile	Ala	Glu	Asn	Pro	Ser	Val	Pro				
225					230					235					240				
Gln	Ala	Leu	Glu	Asn	Val	Ile	Ile	Lys	Ala	Thr	Ala	Lys	Lys	Leu	Thr				
				245					250					255					
Asn	Arg	Tyr	Arg	Ser	Val	Ser	Glu	Met	Tyr	Val	Asp	Leu	Ser	Ser	Ser				
			260					265					270						
Leu	Ser	Tyr	Asn	Arg	Arg	Asn	Glu	Ser	Lys	Leu	Ile	Phe	Asp	Glu	Thr				
		275					280					285							
Ser	Lys	Ala	Asp	Thr	Lys	Thr	Leu	Pro	Lys	Val	Ser	Gln	Ser	Thr	Leu				
	290					295					300								
Thr	Ser	Ile	Pro	Lys	Val	Gln	Ala	Gln	Thr	Glu	His	Lys	Ser	Ile	Lys				
305					310					315					320				
Asn	Pro	Ser	Gln	Ala	Val	Thr	Glu	Glu	Thr	Tyr	Gln	Pro	Gln	Ala	Pro				
				325					330					335					
Lys	Lys	His	Arg	Phe	Lys	Met	Arg	Tyr	Leu	Ile	Leu	Leu	Ala	Ser	Leu				
			340					345					350						
Val	Leu	Val	Ala	Ala	Ser	Leu	Ile	Trp	Ile	Leu	Ser	Arg	Thr	Pro	Ala				
	355						360					365							
Thr	Ile	Ala	Ile	Pro	Asp	Val	Ala	Gly	Gln	Thr	Val	Ala	Glu	Ala	Lys				
	370					375					380								
Glu	Thr	Leu	Lys	Lys	Ala	Asn	Phe	Glu	Ile	Gly	Glu	Glu	Lys	Thr	Glu				
385					390					395					400				
Ala	Ser	Glu	Lys	Val	Glu	Glu	Gly	Arg	Ile	Ile	Arg	Thr	Asp	Pro	Gly				
				405					410					415					
Ala	Gly	Thr	Gly	Arg	Lys	Glu	Gly	Thr	Lys	Ile	Asn	Leu	Val	Val	Ser				
			420					425					430						
Ser	Gly	Lys	Gln	Ser	Phe	Gln	Ile	Ser	Asn	Tyr	Val	Gly	Arg	Lys	Ser				
		435					440					445							



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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 99  
<211> 659  
<212> PRT

<213> Streptococcus pneumoniae PJ-1466\_7F (serotype 7F)

<400> 99

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Val Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

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

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

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 100

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-615\_9A (serotype 9A)

<400> 100

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser

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

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 101

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1255\_9V (serotype 9V)

<400> 101

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu



290

295

300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 102

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1410\_9V (serotype 9V)

<400> 102

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro

325

330

335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 103

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1374\_10C (serotype 10C)

<400> 103

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala

355

360

365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Ile Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 104

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ02-912\_12F (serotype 12F)

<400> 104

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140



Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu

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

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 105

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1364\_14 (serotype 14)

<400> 105

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser

420		425		430
Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser	435	440		445
Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu	450	455		460
Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val	465	470		475
Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala	485	490		495
Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu	500	505		510
Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Asp Leu Lys	515	520		525
Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser	530	535		540
Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly	545	550		555
Thr Thr Tyr Asp Val Ser Lys Pro Thr Gln Ile Val Leu Thr Val Ala	565	570		575
Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu	580	585		590
Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala	595	600		605
Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu	610	615		620
Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu	625	630		635
Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser	645	650		655
Ala Thr Pro				

<210> 106  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae PJ-1445\_15B (serotype 15B)

<400> 106

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ala Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu

450

455

460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
 465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 107

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-3\_15C (serotype 15C)

<400> 107



Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Asp Leu Ser Lys Ala

485

490

495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
 500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
 515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 108

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-2449\_16F (serotype 16F)

<400> 108

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys

515

520

525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
 530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
 545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
 580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 109

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1874\_17A (serotype 17A)

<400> 109

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly



545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 110

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-2129\_17F (serotype 17F)

<400> 110

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Val Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Glu Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu

580

585

590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
 595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
 610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 111

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-2245\_18C (serotype 18C)

<400> 111

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu

610

615

620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
 625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
 645 650 655

Ala Thr Pro

<210> 112

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-132\_18F (serotype 18F)

<400> 112

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400



Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser

645

650

655

Ala Thr Pro

&lt;210&gt; 113

&lt;211&gt; 659

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae PJ-1327\_19A (serotype 19A)

&lt;400&gt; 113

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
 1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
 20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ser Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
450 455 460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae PJ-1498\_19A (serotype 19A)

<400> 114

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 115  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae PJ-1329\_19F (serotype 19F)

<400> 115

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255



Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 116

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1494\_19F (serotype 19F)

<400> 116

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 117  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae RP-2896\_21 (serotype 21)

<400> 117

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

Ser Asp Val Ile Ser Glu Leu Lys Glu Lys Lys Val Pro Asp Asn Leu  
450 455 460

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 118

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-362\_22A (serotype 22A)

<400> 118

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110



Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 119

<211> 633

<212> PRT

<213> Streptococcus pneumoniae PJ-1291\_22F (serotype 22F)

<400> 119

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Phe Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Val Ile Lys Ala Thr Ala Lys Lys Leu Ser  
245 250 255

Asp Arg Tyr Gln Ser Val Ser Glu Met Tyr Val Asp Leu Ser Thr Ser  
260 265 270

Leu Ser Tyr Asn Arg Arg Asn Glu Pro Lys Leu Val Phe Asp Asp Ala  
275 280 285

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Pro Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Ala Pro Ala Gln Glu Glu Arg Pro Gln Pro Lys  
305 310 315 320

Lys Pro Thr Gln Pro Val Ala Glu Pro Ala Pro Ala Pro Lys Pro Ala  
325 330 335

Lys Lys Arg Lys Phe Lys Ala Arg Tyr Met Ile Leu Leu Ala Ser Leu  
340 345 350

Leu Leu Val Ala Ala Ser Leu Val Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Glu Ala Leu Lys Lys Ser Lys Phe Glu Ala Gly Glu Glu Lys Ser Glu  
385 390 395 400

Ala Ser Asp Thr Val Ala Glu Gly Arg Val Ile Arg Thr Asp Pro Glu  
405 410 415

Ala Gly Ser Gly Arg Lys Glu Gly Thr Lys Val Asn Leu Ile Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Leu Ser Asn Tyr Val Gly Arg Lys Tyr  
435 440 445

Thr Asp Val Val Ala Glu Leu Lys Glu Lys Lys Val Pro Glu Asn Leu  
450 455 460

Ile Lys Met Glu Glu Glu Glu Ser Asn Glu Ser Glu Pro Gly Ile Val  
465 470 475 480

Leu Arg Gln Thr Pro Ala Ser Gly Ser Thr Tyr Asp Leu Ser Lys Ala  
485 490 495

Thr Thr Ile Thr Leu Thr Val Ala Lys Lys Val Thr Ser Val Ser Met  
500 505 510

Pro Asn Tyr Ile Gly Ser Ser Leu Glu Phe Thr Lys Asn Asn Leu Thr  
515 520 525

Gln Ile Val Gly Val Lys Glu Ala Asn Ile Glu Val Val Glu Val Ser  
530 535 540

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

Arg Ala Gly Glu Gln Val Asp Leu Ala Ser Thr Arg Ile Lys Leu Ser  
565 570 575

Ile Tyr Lys Pro Lys Thr Pro Pro Ser Thr Ser Ser Ser Asn Pro Ala  
580 585 590

Gln Arg Gly Asn Gln Gly Ser Pro Thr Ser Pro Asn Gln Gly Asn Gln  
595 600 605

Gln Gly Asn Gln Gln Gly Asn Thr Pro Ser Ser Ser His Pro Ile Ser  
610 615 620

Ile Arg Cys Ala Asn Asn Ala Gly Ala  
625 630

<210> 120

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1248\_23F (serotype 23F)

<400> 120

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 121

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-2250\_24A (serotype 24A)



<400> 121

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Ala Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 122

<211> 659

<212> PRT

<213> Streptococcus pneumoniae I-59\_25F (serotype 25F)

<400> 122

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu

20

25

30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
 35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
 50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 123

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1857\_27 (serotype 27)

<400> 123

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala

50

55

60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
 65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
 85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Leu Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540



Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 124

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1287\_31 (serotype 31)

<400> 124

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu

85

90

95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
 100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
 115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
 130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
 145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
 165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
 180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
 195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
 210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Ala Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 125

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1283\_33F (serotype 33F)

<400> 125

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His

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

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Ala Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 126

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1176\_34 (serotype 34)

<400> 126

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala

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



Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Val Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 127

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-1322\_35F (serotype 35F)

<400> 127

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln

180	185	190
Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly		
195	200	205
His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His		
210	215	220
Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro		
225	230	235
Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr		
	245	250
Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser		
	260	265
Leu Ser Tyr Asn Arg Arg Asn Glu Ser Lys Leu Ile Phe Asp Glu Thr		
	275	280
Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu		
	290	295
Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys		
305	310	315
Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro		
	325	330
Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu		
	340	345
Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala		
	355	360
Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys		
	370	375
Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu		
385	390	395
Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly		
	405	410
Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser		
	420	425
		430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

Leu Lys Gln Ser Leu Pro Glu Gly Thr Thr Tyr Ala Leu Ser Lys Ala  
485 490 495

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 128  
<211> 659  
<212> PRT  
<213> Streptococcus pneumoniae PJ-1369\_35F (serotype 35F)

<400> 128

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His

210

215

220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Pro Ser Val Pro  
 225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr  
 245 250 255

Asn Arg Tyr Arg Ser Val Ser Glu Met Tyr Val Asp Leu Ser Ser Ser  
 260 265 270

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

Ser Lys Ala Asp Thr Lys Thr Leu Pro Lys Val Ser Gln Ser Thr Leu  
 290 295 300

Thr Ser Ile Pro Lys Val Gln Ala Gln Thr Glu His Lys Ser Ile Lys  
 305 310 315 320

Asn Pro Ser Gln Ala Val Thr Glu Glu Thr Tyr Gln Pro Gln Ala Pro  
 325 330 335

Lys Lys His Arg Phe Lys Met Arg Tyr Leu Ile Leu Leu Ala Ser Leu  
 340 345 350

Val Leu Val Ala Ala Ser Leu Ile Trp Ile Leu Ser Arg Thr Pro Ala  
 355 360 365

Thr Ile Ala Ile Pro Asp Val Ala Gly Gln Thr Val Ala Glu Ala Lys  
 370 375 380

Ala Thr Leu Lys Lys Ala Asn Phe Glu Ile Gly Glu Glu Lys Thr Glu  
 385 390 395 400

Ala Ser Glu Lys Val Glu Glu Gly Arg Ile Ile Arg Thr Asp Pro Gly  
 405 410 415

Ala Gly Thr Gly Arg Lys Glu Gly Thr Lys Ile Asn Leu Val Val Ser  
 420 425 430

Ser Gly Lys Gln Ser Phe Gln Ile Ser Asn Tyr Val Gly Arg Lys Ser  
 435 440 445

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

Ile Lys Ile Glu Glu Glu Glu Ser Asn Glu Ser Glu Ala Gly Thr Val  
465 470 475 480

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

Thr Gln Ile Ile Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 129

<211> 659

<212> PRT

<213> Streptococcus pneumoniae PJ-2185\_40 (serotype 40)

<400> 129

Met Ile Gln Ile Gly Lys Ile Phe Ala Gly Arg Tyr Arg Ile Val Lys  
1 5 10 15

Gln Ile Gly Arg Gly Gly Met Ala Asp Val Tyr Leu Ala Lys Asp Leu  
20 25 30

Ile Leu Asp Gly Glu Glu Val Ala Val Lys Val Leu Arg Thr Asn Tyr  
35 40 45

Gln Thr Asp Pro Ile Ala Val Ala Arg Phe Gln Arg Glu Ala Arg Ala  
50 55 60

Met Ala Asp Leu Asp His Pro His Ile Val Arg Ile Thr Asp Ile Gly  
65 70 75 80

Glu Glu Asp Gly Gln Gln Tyr Leu Ala Met Glu Tyr Val Ala Gly Leu  
85 90 95

Asp Leu Lys Arg Tyr Ile Lys Glu His Tyr Pro Leu Ser Asn Glu Glu  
100 105 110

Ala Val Arg Ile Met Gly Gln Ile Leu Leu Ala Met Arg Leu Ala His  
115 120 125

Thr Arg Gly Ile Val His Arg Asp Leu Lys Pro Gln Asn Ile Leu Leu  
130 135 140

Thr Pro Asp Gly Thr Ala Lys Val Thr Asp Phe Gly Ile Ala Val Ala  
145 150 155 160

Phe Ala Glu Thr Ser Leu Thr Gln Thr Asn Ser Met Leu Gly Ser Val  
165 170 175

His Tyr Leu Ser Pro Glu Gln Ala Arg Gly Ser Lys Ala Thr Val Gln  
180 185 190

Ser Asp Ile Tyr Ala Met Gly Ile Ile Phe Tyr Glu Met Leu Thr Gly  
195 200 205

His Ile Pro Tyr Asp Gly Asp Ser Ala Val Thr Ile Ala Leu Gln His  
210 215 220

Phe Gln Lys Pro Leu Pro Ser Val Ile Ala Glu Asn Ser Ser Val Pro  
225 230 235 240

Gln Ala Leu Glu Asn Val Ile Ile Lys Ala Thr Ala Lys Lys Leu Thr



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

Thr Gln Ile Val Leu Thr Val Ala Lys Lys Ala Thr Thr Ile Gln Leu  
500 505 510

Gly Asn Tyr Ile Gly Arg Asn Ser Thr Glu Val Ile Ser Glu Leu Lys  
515 520 525

Gln Lys Lys Val Pro Glu Asn Leu Ile Lys Ile Glu Glu Glu Glu Ser  
530 535 540

Ser Glu Ser Glu Pro Gly Thr Ile Met Lys Gln Ser Pro Gly Ala Gly  
545 550 555 560

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

Lys Lys Val Thr Ser Val Ala Met Pro Ser Tyr Ile Gly Ser Ser Leu  
580 585 590

Glu Phe Thr Lys Asn Asn Leu Ile Gln Ile Val Gly Ile Lys Glu Ala  
595 600 605

Asn Ile Glu Val Val Glu Val Thr Thr Ala Pro Ala Gly Ser Ala Glu  
610 615 620

Gly Met Val Val Glu Gln Ser Pro Arg Ala Gly Glu Lys Val Asp Leu  
625 630 635 640

Asn Lys Thr Arg Val Lys Ile Ser Ile Tyr Lys Pro Lys Thr Thr Ser  
645 650 655

Ala Thr Pro

<210> 130  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 5 (serotype 5)

<400> 130

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

Ile Asn Thr Glu Ala Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val  
225 230 235 240

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu

275

280

285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
 290 295 300

Glu Gly Leu Ala Lys  
 305

&lt;210&gt; 131

&lt;211&gt; 309

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae CDC 8 (serotype 7A)

&lt;400&gt; 131

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
 1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
 20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
 35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
 50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
 85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
 100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
 115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
 130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
 145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
 165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 132  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 12 (serotype 8)

<400> 132

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser

[illegible]

<210> 133  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 33 (serotype 15C)

<400> 133

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Ala Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 134  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 36 (serotype 16F)  
  
<400> 134

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Val Ile Ala  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Ala Ala Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Val Gly Gln  
50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110



Lys Asp Tyr Phe Ala Val Ser Glu Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Lys Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Ser Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ala Lys Ala Lys Phe Asn  
180 185 190

Asn Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Cys Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Asn Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 135  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 38 (serotype 17F)  
  
<400> 135

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Ala Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser

				245					250						255	
Val	Asp	Asp	Arg	Pro	Met	Lys	Thr	Val	Ser	Gln	Asp	Thr	Asn	Ile	Pro	
			260					265					270			
Ile	Tyr	Ala	Gln	Ile	Phe	Thr	Asp	Ser	Ile	Ala	Glu	Gln	Gly	Lys	Glu	
		275					280					285				
Gly	Asp	Ser	Tyr	Tyr	Ser	Met	Met	Lys	Tyr	Asn	Leu	Asp	Lys	Ile	Ala	
	290					295					300					
Glu	Gly	Leu	Ala	Lys												
305																
<210>	136															
<211>	309															
<212>	PRT															
<213>	Streptococcus pneumoniae CDC 56 (serotype 24F)															
<400>	136															
Met	Lys	Lys	Leu	Gly	Thr	Leu	Leu	Val	Leu	Phe	Leu	Ser	Ala	Ile	Ile	
1				5					10					15		
Leu	Val	Ala	Cys	Ala	Ser	Gly	Lys	Lys	Asp	Thr	Thr	Ser	Gly	Gln	Lys	
			20					25					30			
Leu	Lys	Val	Val	Ala	Thr	Asn	Ser	Ile	Ile	Ala	Asp	Ile	Thr	Lys	Asn	
		35					40					45				
Ile	Ala	Gly	Asp	Lys	Ile	Asp	Leu	His	Ser	Ile	Val	Pro	Ile	Gly	Gln	
	50					55					60					
Asp	Pro	His	Glu	Tyr	Glu	Pro	Leu	Pro	Glu	Asp	Val	Lys	Lys	Thr	Ser	
65					70					75					80	
Glu	Ala	Asp	Leu	Ile	Phe	Tyr	Asn	Gly	Ile	Asn	Leu	Glu	Thr	Gly	Gly	
				85					90					95		
Asn	Ala	Trp	Phe	Thr	Lys	Leu	Val	Glu	Asn	Ala	Lys	Lys	Thr	Glu	Asn	
			100					105					110			
Lys	Asp	Tyr	Phe	Ala	Val	Ser	Asp	Gly	Val	Asp	Val	Ile	Tyr	Leu	Glu	
		115					120					125				
Gly	Gln	Asn	Glu	Lys	Gly	Lys	Glu	Asp	Pro	His	Ala	Trp	Leu	Asn	Leu	
	130					135					140					

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 137  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 58 (serotype 25F)  
  
<400> 137

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Val Ile Ala  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Ala Ala Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn

35

40

45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Val Gly Gln  
 50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
 85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
 100 105 110

Lys Asp Tyr Phe Ala Val Ser Glu Gly Val Asp Val Ile Tyr Leu Glu  
 115 120 125

Gly Lys Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
 130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
 145 150 155 160

Lys Asp Pro Ser Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
 165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ala Lys Ala Lys Phe Asn  
 180 185 190

Asn Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Cys Phe  
 195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
 210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
 245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
 275 280 285

Gly Asp Ser Tyr Tyr Asn Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 138  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 66 (serotype 33A)  
  
<400> 138

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asn Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 139  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 69 (serotype 33D)  
  
<400> 139

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305



<210> 140  
<211> 309  
<212> PRT  
<213> Streptococcus pneumoniae CDC 74 (serotype 35C)

<400> 140

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu

210

215

220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Ala Glu Ser Ser  
 245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
 275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
 290 295 300

Glu Gly Leu Ala Lys  
 305

&lt;210&gt; 141

&lt;211&gt; 309

&lt;212&gt; PRT

&lt;213&gt; Streptococcus pneumoniae CDC 96 (serotype 19A)

&lt;400&gt; 141

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
 1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
 20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
 35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
 50 55 60

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

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
 85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
 100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asn Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 142

<211> 309

<212> PRT

<213> Streptococcus pneumoniae CDC 114 (serotype 35B)

<400> 142

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

1		5		10		15													
Leu	Val	Ala	Cys	Ala	Ser	Gly	Lys	Lys	Asp	Thr	Thr	Ser	Gly	Gln	Lys				
		20						25					30						
Leu	Lys	Val	Val	Ala	Thr	Asn	Ser	Ile	Ile	Ala	Asp	Ile	Thr	Lys	Asn				
		35					40					45							
Ile	Ala	Gly	Asp	Lys	Ile	Asp	Leu	His	Ser	Ile	Val	Pro	Ile	Gly	Gln				
	50					55					60								
Asp	Pro	His	Glu	Tyr	Glu	Pro	Leu	Pro	Glu	Asp	Val	Lys	Lys	Thr	Ser				
65					70					75					80				
Glu	Ala	Asp	Leu	Ile	Phe	Tyr	Asn	Gly	Ile	Asn	Leu	Glu	Thr	Gly	Gly				
			85					90						95					
Asn	Ala	Trp	Phe	Thr	Lys	Leu	Val	Glu	Asn	Ala	Lys	Lys	Thr	Glu	Asn				
			100					105						110					
Lys	Asp	Tyr	Phe	Ala	Val	Ser	Asp	Gly	Val	Asp	Val	Ile	Tyr	Leu	Glu				
		115					120					125							
Gly	Gln	Asn	Glu	Lys	Gly	Lys	Glu	Asp	Pro	His	Ala	Trp	Leu	Asn	Leu				
	130					135					140								
Glu	Asn	Gly	Ile	Ile	Phe	Ala	Lys	Asn	Ile	Ala	Lys	Gln	Leu	Ser	Ala				
145					150					155					160				
Lys	Asp	Pro	Asn	Asn	Lys	Glu	Phe	Tyr	Glu	Lys	Asn	Leu	Lys	Glu	Tyr				
				165					170					175					
Thr	Asp	Lys	Leu	Asp	Lys	Leu	Asp	Lys	Glu	Ser	Lys	Asp	Lys	Phe	Asn				
			180					185						190					
Lys	Ile	Ser	Ala	Glu	Lys	Lys	Leu	Ile	Val	Thr	Ser	Glu	Gly	Ala	Phe				
		195					200					205							
Lys	Tyr	Phe	Ser	Lys	Ala	Tyr	Gly	Val	Pro	Ser	Ala	Tyr	Ile	Trp	Glu				
	210					215					220								
Ile	Asn	Thr	Glu	Glu	Glu	Gly	Thr	Pro	Glu	Gln	Ile	Lys	Thr	Leu	Val				
225					230					235					240				
Glu	Lys	Leu	Arg	Gln	Thr	Lys	Val	Pro	Ser	Leu	Phe	Val	Glu	Ser	Ser				
				245					250					255					

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305

<210> 143

<211> 309

<212> PRT

<213> Streptococcus pneumoniae CDC 116 (serotype 23F)

<400> 143

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile  
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys  
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn  
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln  
50 55 60

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

Glu Ala Asn Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly  
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn  
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu  
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu  
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala  
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr  
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn  
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe  
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu  
210 215 220

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

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser  
245 250 255

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

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu  
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala  
290 295 300

Glu Gly Leu Ala Lys  
305