

SEQUENCE LISTING

<110> GLAXOSMITHKLINE BIOLOGICALS S.A.
 POOLMAN, JAN
 BLAIS, NORMAND
 LABBE, STEVE

<120> FUSION PROTEINS & COMBINATION VACCINES

<130> 55075317-28PCT

<150> 61/474779
 <151> 2011-04-13

<150> 61/534012
 <151> 2011-09-13

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<170> FastSEQ for Windows Version 4.0

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 <213> Haemophilus influenzae

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 Ala Asn Tyr His Leu Thr Gln Val Arg
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<400> 2
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 1 5

<210> 3
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<400> 3
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<210> 4
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<400> 4

pctca2012050236-seq1

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
      145      150      155      160

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<210> 5
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 <213> Haemophilus influenzae

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<400> 5
Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
      145      150      155      160

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<210> 6
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 <213> Haemophilus influenzae

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<400> 6
Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Arg Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95

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pctca2012050236-seq1

Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Ile	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 7
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<400> 7

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Lys	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20					25					30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35				40						45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50				55					60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65				70					75					80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
			85					90				95			
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100				105					110			
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 8
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 <213> Haemophilus influenzae

<400> 8

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20					25					30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35				40						45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50				55					60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65				70					75					80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
			85					90				95			
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100				105					110			
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 9
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<213> Haemophilus influenzae

<400> 9

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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<210> 10

<211> 160

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<213> Haemophilus influenzae

<400> 10

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Met Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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<210> 11

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 11

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10
Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60

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

<210> 12
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 <212> PRT
 <213> Haemophilus influenzae

<400> 12

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Met	Lys	Leu	Ala	Pro
			20					25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Val	Asp	Asn	Gln	Glu	Pro	Gln	Ile
	50					55					60				
Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val	Tyr
65					70					75					80
Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile	Leu
			85					90					95		
Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr	Asp
			100					105					110		
Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys	Lys
		115					120					125			
His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala	Gln
	130					135					140				
Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys	
145					150					155					

<210> 13
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 <213> Haemophilus influenzae

<400> 13

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
			20					25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Thr	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
			85					90					95		
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 14
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 <212> PRT
 <213> Haemophilus influenzae

<400> 14
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 Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 15
 <211> 194
 <212> PRT
 <213> Haemophilus influenzae

<400> 15
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Thr Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Thr Pro
 20 25 30
 Pro Thr Asp Val Gln Ser Gly Tyr Val Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Ile Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Asn
 145 150 155 160
 Lys Lys Ile Cys Thr Leu Ile Ser Leu Asn Phe Ile Gln Leu Leu Gly
 165 170 175
 Cys Arg Glu Tyr Ser Ile Phe Leu Gln Leu Leu Leu Phe Tyr Cys Trp
 180 185 190
 His Phe

<210> 16
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 <212> PRT
 <213> Haemophilus influenzae

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<400> 16

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
145      150      155      160
Ile Lys Lys Ile Cys Thr Leu Ile Ser Leu Asn Phe Ile Gln Leu Leu
165      170      175
Gly Cys Arg Glu Tyr Ser Ile Phe Leu Gln Leu Leu Leu Phe Tyr Cys
180      185      190
Trp His Phe
      195

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<210> 17

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 17

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Met Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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<210> 18

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 18

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20      25      30

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pctca2012050236-seq1

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

<210> 19
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 <212> PRT
 <213> Haemophilus influenzae

<400> 19

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Lys	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 20
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 <213> Haemophilus influenzae

<400> 20

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Thr	Gln	Lys	Val	Glu	Gln	Asn	Asp	Val	Lys	Leu	Thr	Ala
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Phe	Val	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			

pctca2012050236-seq1

Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Leu Val Asp Lys Lys
 145 150 155 160

<210> 21
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 21
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 22
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 22
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Ile Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 23
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 23

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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<210> 24

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 24

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Thr Gln Lys Val Glu Gln Asn Asp Val Lys Leu Thr Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Val Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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<210> 25

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 25

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95

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pctca2012050236-seq1
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 26
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 26
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Thr Gln Lys Val Glu Gln Asn Asp Val Lys Leu Thr Ala
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Val Arg Leu Val Lys Asn Ala Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 27
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 27
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Ile Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 28
 <211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 28

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
      145      150      155      160

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<210> 29

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 29

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Thr Val Val Asn Leu Asp Lys Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
      145      150      155      160

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<210> 30

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 30

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60

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

<210> 31
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 31

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Lys	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
			20					25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 32
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 32

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
			20					25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 33
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 33
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Thr Gln Lys Val Glu Gln Asn Asp Val Lys Leu Thr Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Val Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 34
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 34
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 35
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 35
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30

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

<210> 36
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 36

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Lys	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75				80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 37
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 37

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Thr	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75				80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Ile	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			

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Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 38
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 38
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Thr Gln Lys Val Glu Gln Asn Asp Val Lys Leu Thr Ala
 20 25 30
 Pro Ala Asp Val Arg Ser Gly Tyr Val Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 39
 <211> 159
 <212> PRT
 <213> Haemophilus influenzae

<400> 39
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Tyr Lys Ile Leu
 85 90 95
 Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp
 100 105 110
 Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys
 115 120 125
 His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala Gln
 130 135 140
 Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
 145 150 155

<210> 40
 <211> 159
 <212> PRT
 <213> Haemophilus influenzae

<400> 40

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Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5				10						15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Lys	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75				80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Tyr	Lys	Ile	Leu
				85					90					95	
Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr	Asp
			100					105					110		
Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys	Lys
		115					120					125			
His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala	Gln
	130					135					140				
Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys	
145					150					155					

<210> 41
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 41

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5				10						15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75				80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 42
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 42

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5				10						15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75				80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	

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Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 43
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 43

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85				90						95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 44
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 44

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85				90						95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 45
 <211> 160

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<212> PRT

<213> Haemophilus influenzae

<400> 45

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Thr Val Val Asn Leu Asp Lys Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Ser Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
      145      150      155      160

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<210> 46

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 46

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Thr Gln Lys Val Glu Gln Asn Asp Val Lys Leu Thr Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Val Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
      65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
      85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
      100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
      115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Val Tyr Asn Ala Ala
      130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
      145      150      155      160

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<210> 47

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 47

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Thr Gln Lys Val Glu Gln Asn Asp Val Lys Leu Thr Pro
      20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Val Arg Leu Val Lys Asn Val Asn
      35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
      50      55      60

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

<210> 48
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 48

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Lys	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60					
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 49
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 49

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60					
Ile	Val	His	Phe	Asp	Thr	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 50
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 50
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Thr Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 51
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 51
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Thr Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Thr Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 52
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 52
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30

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

<210> 53
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 53

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Thr	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150					155					160

<210> 54
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 54

Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Thr	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20						25				30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75					80
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
				85					90					95	
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Ile	Arg	Thr	Asp	Phe	Tyr
			100					105					110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125			

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 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 55
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 55
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 56
 <211> 160
 <212> PRT
 <213> Haemophilus influenzae

<400> 56
 Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1 5 10 15
 Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20 25 30
 Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35 40 45
 Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50 55 60
 Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65 70 75 80
 Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85 90 95
 Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
 100 105 110
 Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
 115 120 125
 Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
 130 135 140
 Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
 145 150 155 160

<210> 57
 <211> 159
 <212> PRT
 <213> Haemophilus influenzae

<400> 57

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Met	Lys	Lys	Ile	Ile	Leu	Thr	Leu	Ser	Leu	Gly	Leu	Leu	Thr	Ala	Cys
1				5					10					15	
Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Met	Lys	Leu	Ala	Pro
		20						25					30		
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Val	Asp	Asn	Gln	Glu	Pro	Gln	Ile
	50					55					60				
Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val	Tyr
65					70					75				80	
Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile	Leu
				85					90					95	
Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr	Asp
			100					105					110		
Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys	Lys
		115					120					125			
His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala	Gln
	130					135					140				
Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Lys	Ala	Phe	Ser	Val	Asp	Lys	Lys	
145					150					155					

<210> 58
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 58

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
		20						25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 59
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 59

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
		20						25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Thr	Thr	Lys	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	

pctca2012050236-seq1
 Asn Gly Ala Ile Thr Val Ala Gly Asn Gly Thr Leu Asp Gly Met Ser
 100 105 110
 Tyr Thr Leu Thr Ala Glu Gly Asp Ser Ala Lys Gly Val Thr Trp Lys
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 60
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 60
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 61
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 61
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Lys Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Ile Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Ala Gly Asn Ala Ala Ala Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 62
 <211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 62

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85      90      95
Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 63

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 63

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ser Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Val Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85      90      95
Asn Gly Ala Ile Thr Val Ala Gly Asn Gly Thr Leu Asp Gly Met Ser
100      105      110
Tyr Thr Leu Thr Ala Glu Gly Asp Ser Ala Lys Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 64

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 64

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60

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Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 65
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 65

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
		50				55				60					
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 66
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 66

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
		50				55				60					
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 67
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 67
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Lys Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Ile Thr Asn Cys Met Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Ala Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Ile Thr Gln
 145

<210> 68
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 68
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ser Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Lys Gly Asn Ala Thr Ala Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Arg Ser Val Thr Lys
 145

<210> 69
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 69
 Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30

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

<210> 70
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 70

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5				10						15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Gly	Lys	Pro	Ser	Ser	Cys	Ser	Gly	Gly	Ser	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90				95		
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Ser	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115				120						125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 71
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 71

Met	Lys	Leu	Thr	Thr	Leu	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5				10						15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Thr	Thr	Ser	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Lys	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Ile	Thr	Gln
				85					90				95		
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asn	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Lys	Gly	Asn	Ala	Ala	Ala	Gly	Val	Thr	Trp	Thr
		115				120						125			

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Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Lys
 145

<210> 72
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 72
 Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 73
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 73
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ser Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ser Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Lys Gly Asn Ala Thr Ala Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Arg Ser Val Thr Lys
 145

<210> 74
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 74

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Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
			85						90				95		
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 75
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 75

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln
			85						90				95		
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Glu	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 76
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 76

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ser	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln
			85						90				95		

pctca2012050236-seq1

<210>	77
<211>	149
<212>	PRT

<400> 77

$\langle 210 \rangle$	78
$\langle 211 \rangle$	149
$\langle 212 \rangle$	PRT

<400> 78

<210>	79
<211>	149

pctca2012050236-seq1

<212> PRT

<213> Haemophilus influenzae

<400> 79

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85      90      95
Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Glu Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 80

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 80

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85      90      95
Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Glu Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 81

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 81

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ser Asp Val Glu Leu Cys Val Tyr
 50      55      60

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pctca2012050236-seq1

Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Ser	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85				90						95	
Asn	Gly	Ala	Ile	Thr	Val	Ala	Gly	Asn	Gly	Thr	Leu	Asp	Gly	Met	Ser
			100					105					110		
Tyr	Thr	Leu	Thr	Ala	Glu	Gly	Asp	Ser	Ala	Lys	Gly	Val	Thr	Trp	Lys
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Lys											
145															

<210> 82
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 82

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5				10						15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55				60					
Ser	Thr	Asn	Glu	Ala	Thr	Lys	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
			85					90						95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Ser	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 83
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 83

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5				10						15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55				60					
Ser	Thr	Asn	Glu	Ala	Thr	Lys	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
			85					90						95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Ser	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 84
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 84
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 85
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 85
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Ile Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ser Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Lys Gly Asn Ala Thr Ala Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Arg Ser Val Thr Lys
 145

<210> 86
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 86
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30

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

<210> 87
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 87

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5				10						15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25				30			
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55				60					
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
	115						120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 88
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 88

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5				10						15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25				30			
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ser	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55				60					
Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Ser	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Val	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
				85					90					95	
Asn	Gly	Ala	Ile	Thr	Val	Ala	Gly	Asn	Gly	Thr	Leu	Asp	Gly	Met	Ser
			100					105					110		
Tyr	Thr	Leu	Thr	Ala	Glu	Gly	Asp	Ser	Ala	Lys	Gly	Val	Thr	Trp	Thr
	115						120					125			

pctca2012050236-seq1
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 89
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 89
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 90
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 90
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 91
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 91

pctca2012050236-seq1

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
      20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
      35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
      50      55      60
Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
      85      90      95
Asn Gly Ala Ile Thr Val Ala Gly Asn Gly Thr Leu Asp Arg Met Ser
      100      105      110
Tyr Thr Leu Thr Ala Glu Gly Asp Ser Ala Lys Gly Val Thr Trp Thr
      115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
      130      135      140
Gly Ser Val Thr Gln
145

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<210> 92

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 92

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
      20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
      35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
      50      55      60
Ser Thr Gly Lys Pro Ser Ser Cys Ser Gly Gly Ser Asn Gly Ile Ala
65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
      85      90      95
Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
      100      105      110
Tyr Ile Leu Gln Ala Ser Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
      115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
      130      135      140
Gly Ser Val Thr Gln
145

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<210> 93

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 93

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Met Lys Leu Thr Thr Gln Thr Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
      20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
      35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ser Asp Val Glu Leu Cys Val Tyr
      50      55      60
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Ile Thr Gln
      85      90      95

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pctca2012050236-seq1
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Thr Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Ile Thr Gln
 145

<210> 94
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 94
 Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Asn Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Lys Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 95
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 95
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Ser Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 96
 <211> 149

pctca2012050236-seq1

<212> PRT

<213> Haemophilus influenzae

<400> 96

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Asn Glu Ala Thr Lys Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85      90      95
Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Ser Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Thr Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 97

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 97

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85      90      95
Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 98

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 98

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60

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Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70					75				80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln
			85						90					95	
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asn	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 99
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 99

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
		50				55				60					
Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Ser	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln
			85						90					95	
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asn	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Lys	Gly	Asn	Ala	Thr	Ala	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Arg	Ser	Val	Thr	Lys											
145															

<210> 100
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 100

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
		50				55				60					
Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Ser	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln
			85						90					95	
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asn	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100					105					110		
Tyr	Ile	Leu	Gln	Ala	Lys	Gly	Asn	Ala	Thr	Ala	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Arg	Ser	Val	Thr	Lys											
145															

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<210> 101
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 101
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 102
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 102
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Lys Gly Asn Ala Thr Ala Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Arg Ser Val Thr Lys
 145

<210> 103
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 103
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30

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

<210> 104
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 104

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20				25						30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55				60					
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
			85						90				95		
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
		100						105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115				120						125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 105
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 105

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20				25						30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55				60					
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
			85						90				95		
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
		100						105					110		
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115				120						125			

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 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 106
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<220>
 <221> VARIANT
 <222> (1)...(149)
 <223> Xaa = glutamine or leucine

<400> 106
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Xaa Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 107
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 107
 Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90
 Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 108

pctca2012050236-seq1

<211> 149
<212> PRT
<213> Haemophilus influenzae

<400> 108

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85      90      95
Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145
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<210> 109
<211> 149
<212> PRT
<213> Haemophilus influenzae

<400> 109

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Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Asn Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Lys Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85      90      95
Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145
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<210> 110
<211> 149
<212> PRT
<213> Haemophilus influenzae

<400> 110

```
Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
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50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Asn Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Lys Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 111

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 111

Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Ser Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Ala Gly Asn Gly Thr Leu Asp Gly Met Ser
 100 105 110
 Tyr Thr Leu Thr Ala Glu Gly Asp Ser Ala Lys Gly Val Thr Trp Lys
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 112

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 112

Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Asn Glu Thr Thr Ser Cys Thr Gly Gly Lys Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
 85 90 95
 Asn Gly Ala Ile Thr Val Ala Gly Asn Gly Thr Leu Asp Gly Met Ser
 100 105 110
 Tyr Thr Leu Thr Ala Glu Gly Asp Ser Ala Lys Gly Val Thr Trp Lys
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln

145

<210> 113
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 113
 Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Asn Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Lys Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 114
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 114
 Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20 25 30
 Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35 40 45
 Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50 55 60
 Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Asn Asn Gly Ile Ala
 65 70 75 80
 Ala Asp Ile Lys Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85 90 95
 Ser Gly Gly Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
 100 105 110
 Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
 115 120 125
 Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
 130 135 140
 Gly Ser Val Thr Gln
 145

<210> 115
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 115
 Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1 5 10 15
 Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala

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Ile	Pro	Ser	20	Gln	Asn	Tyr	Thr	25	Lys	Lys	Ala	Ala	Val	30	Ser	Glu	Leu
		35					40						45				
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr		
	50					55					60						
Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Asn	Asn	Gly	Ile	Ala		
65					70				75					80			
Ala	Asp	Ile	Lys	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln		
			85					90					95				
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu		
			100					105					110				
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr		
	115						120					125					
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys		
	130					135					140						
Gly	Ser	Val	Thr	Gln													
145																	

<210> 116
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 116

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile		
1				5				10						15			
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala		
		20					25						30				
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu		
	35						40					45					
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr		
	50					55					60						
Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala		
65					70				75					80			
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln		
			85					90					95				
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu		
			100					105					110				
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr		
	115						120					125					
Thr	Thr	Cys	Lys	Gly	Thr	Glu	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys		
	130					135					140						
Gly	Ser	Val	Thr	Gln													
145																	

<210> 117
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 117

Met	Lys	Leu	Thr	Thr	Leu	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile		
1				5				10						15			
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala		
		20					25						30				
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu		
	35						40					45					
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr		
	50					55					60						
Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Asn	Asn	Gly	Ile	Ala		
65					70				75					80			
Ala	Asp	Ile	Lys	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln		
			85					90					95				
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu		
			100					105					110				
Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr		

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115	120	125
Thr Thr Cys Lys Gly Thr Asp	Ala Ser Leu Phe Pro	Ala Asn Phe Cys
130	135	140
Gly Ser Val Thr Gln		
145		

<210> 118
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 118

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Gly	Lys	Pro	Ser	Thr	Cys	Ser	Gly	Gly	Ser	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Ala	Ser	Val	Lys	Thr	Gln
			85					90					95		
Ser	Gly	Gly	Ile	Thr	Val	Lys	Gly	Asn	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100				105						110		
Tyr	Ile	Leu	Gln	Ala	Lys	Gly	Asn	Ala	Thr	Ala	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Arg	Ser	Val	Thr	Lys											
145															

<210> 119
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

<400> 119

Met	Lys	Leu	Thr	Thr	Gln	Gln	Thr	Leu	Lys	Lys	Gly	Phe	Thr	Leu	Ile
1				5					10					15	
Glu	Leu	Met	Ile	Val	Ile	Ala	Ile	Ile	Ala	Ile	Leu	Ala	Thr	Ile	Ala
			20					25					30		
Ile	Pro	Ser	Tyr	Gln	Asn	Tyr	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu
		35					40					45			
Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr
	50					55					60				
Ser	Thr	Asn	Glu	Ala	Thr	Lys	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala
65					70				75					80	
Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser
			85					90					95		
Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu
			100				105						110		
Tyr	Ile	Leu	Gln	Ala	Ser	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr
		115					120					125			
Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys
	130					135					140				
Gly	Ser	Val	Thr	Gln											
145															

<210> 120
 <211> 149
 <212> PRT
 <213> Haemophilus influenzae

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<400> 120

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Met Lys Leu Thr Thr Leu Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ala Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85      90      95
Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Gly Ser Val Thr Gln
145

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<210> 121

<211> 149

<212> PRT

<213> Haemophilus influenzae

<400> 121

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Met Lys Leu Thr Thr Gln Gln Thr Leu Lys Lys Gly Phe Thr Leu Ile
 1      5      10      15
Glu Leu Met Ile Val Ile Ala Ile Ile Ala Ile Leu Ala Thr Ile Ala
 20      25      30
Ile Pro Ser Tyr Gln Asn Tyr Thr Lys Lys Ala Ser Val Ser Glu Leu
 35      40      45
Leu Gln Ala Ser Ala Pro Tyr Lys Ser Asp Val Glu Leu Cys Val Tyr
 50      55      60
Ser Thr Gly Lys Pro Ser Thr Cys Ser Gly Gly Ser Asn Gly Ile Ala
 65      70      75      80
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Ala Ser Val Lys Thr Gln
 85      90      95
Ser Gly Gly Ile Thr Val Lys Gly Asn Gly Thr Leu Ala Asn Met Glu
100      105      110
Tyr Ile Leu Gln Ala Lys Gly Asn Ala Thr Ala Gly Val Thr Trp Thr
115      120      125
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
130      135      140
Arg Ser Val Thr Lys
145

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<210> 122

<211> 144

<212> PRT

<213> Haemophilus influenzae

<400> 122

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Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 1      5      10      15
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 20      25      30
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 35      40      45
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 50      55      60
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 65      70      75      80
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr

```

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Asp	Glu	Phe	Trp	85	Gly	Gln	Gly	Leu	Arg	90	Ala	Ala	Pro	Lys	Lys	95	Gln	Lys
			100						105						110			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala			
		115					120					125						
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys			
	130					135					140							

<210> 123
 <211> 143
 <212> PRT
 <213> Haemophilus influenzae

<400> 123

Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro	Pro			
1				5					10				15					
Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn	Tyr			
			20					25				30						
Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln	Ile			
		35					40				45							
Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val	Tyr			
	50					55					60							
Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile	Leu			
65				70					75					80				
Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr	Asp			
			85						90				95					
Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys	Lys			
			100					105					110					
His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala	Gln			
		115					120					125						
Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys				
	130					135					140							

<210> 124
 <211> 142
 <212> PRT
 <213> Haemophilus influenzae

<400> 124

Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro	Pro	Thr			
1				5					10				15					
Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn	Tyr	Tyr			
			20					25				30						
Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln	Ile	Val			
		35					40				45							
His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val	Tyr	Pro			
	50					55					60							
Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile	Leu	Asn			
65				70					75					80				
Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr	Asp	Glu			
			85					90					95					
Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys	Lys	His			
			100				105					110						
Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala	Gln	Ile			
		115					120					125						
Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys					
	130					135					140							

<210> 125
 <211> 141
 <212> PRT
 <213> Haemophilus influenzae

<400> 125

Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro	Pro	Thr	Asp			
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	--	--	--

pctca2012050236-seq1

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1      5      10      15
Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn Tyr Tyr Ile
20      25      30
Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln Ile Val His
35      40      45
Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val Tyr Pro Glu
50      55      60
Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys
65      70      75      80
Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp Glu Phe
85      90      95
Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys His Thr
100      105      110
Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala Gln Ile Ile
115      120      125
Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
130      135      140

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<210> 126

<211> 139

<212> PRT

<213> Haemophilus influenzae

<400> 126

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1      5      10      15
Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro Pro Thr Asp Val Arg
20      25      30
Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn Tyr Tyr Ile Asp Ser
35      40      45
Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln Ile Val His Phe Asp
50      55      60
Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val Tyr Pro Glu Pro Lys
65      70      75      80
Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys Ala Asn
85      90      95
Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp Glu Phe Trp Gly
100      105      110
Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys His Thr Leu Ser
115      120      125
Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala Gln Ile Ile Cys Ala
130      135
Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys

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<210> 127

<211> 110

<212> PRT

<213> Haemophilus influenzae

<400> 127

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1      5      10      15
Thr Lys Lys Ala Ala Val Ser Glu Leu Leu Gln Ala Ser Ala Pro Tyr
20      25      30
Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr Asn Glu Thr Thr Asn
35      40      45
Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp Ile Thr Thr Ala Lys
50      55      60
Gly Tyr Val Lys Ser Val Thr Ser Asn Gly Ala Ile Thr Val Lys
65      70      75      80
Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile Leu Gln Ala Thr Gly
85      90      95
Asn Ala Ala Thr Gly Val Thr Trp Thr Thr Thr Cys Lys Gly Thr Asp
100      105      110
Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser Val Thr Gln

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<210> 128

pctca2012050236-seq1

<211> 25
 <212> PRT
 <213> Haemophilus influenzae

<400> 128
 Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys
 1 5 10 15
 Ala Asn Tyr His Leu Thr Gln Val Arg
 20 25

<210> 129
 <211> 66
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> pelB signal peptide

<400> 129
 atgaaatacc tgctgccgac cgctgctgct ggtctgctgc tcctcgctgc ccagccggcg 60
 atggcc 66

<210> 130
 <211> 22
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> pelB signal peptide

<400> 130
 Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Ala
 1 5 10 15
 Ala Gln Pro Ala Met Ala
 20

<210> 131
 <211> 57
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> FlgI signal peptide

<400> 131
 atgattaaat ttctctctgc attaatctt ctactgggtca cgacggcggc tcaggct 57

<210> 132
 <211> 19
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> FlgI signal peptide

<400> 132
 Met Ile Lys Phe Leu Ser Ala Leu Ile Leu Leu Leu Val Thr Thr Ala
 1 5 10 15
 Ala Gln Ala

<210> 133
 <211> 69
 <212> DNA
 <213> Artificial Sequence

pctca2012050236-seq1

<220>

<223> NadA signal peptide

<400> 133

atgaaacact ttccatccaa agtactgacc acagccatcc ttgccacttt ctgtagcggc 60
gcactggca 69

<210> 134

<211> 23

<212> PRT

<213> Artificial Sequence

<220>

<223> NadA signal peptide

<400> 134

Met Lys His Phe Pro Ser Lys Val Leu Thr Thr Ala Ile Leu Ala Thr
1 5 10 15
Phe Cys Ser Gly Ala Leu Ala
20

<210> 135

<211> 852

<212> DNA

<213> Artificial Sequence

<220>

<223> LVL312

<400> 135

atgattaaat ttctctctgc attaattctt ctactgggtca cgacggcggc tcaggctgag 60
actaaaaaag cagcggatc tgaattactg caagcgtcag cgccttataa ggctgatgtg 120
gaattatgtg tatatagcac aaatgaaaca acaaactgta cgggtggaaa aaatgggtatt 180
gcagcagata taaccacagc aaaaggctat gtaaaatcag tgacaacaag caacgggtgca 240
ataacagtaa aaggggatgg cacattggca aatatggaat atattttgca agctacagggt 300
aatgctgcaa caggtgtaac ttggacaaca acttgcaaag gaacgggatgc ctctttattt 360
ccagcaaaatt ttgcggaag tgtcacacaa ggcggcgcgc agattcagaa ggctgaacaa 420
aatgatgtga agctggcacc gccgactgat gtacgaagcg gatataatcg ttgggtaaaag 480
aatgtgaatt attacatcga tagtgaatcg atctgggtgg ataaccaaga gccacaaatt 540
gtacattttg atgcagtggg gaatttagat aagggtattg atgtttatcc tgagcctaaa 600
cgttatgcac gttctgttcg tcagtataag atcttgaatt gtgcaaatta tcatttaact 660
caagtacgaa ctgatttcta tgatgaattt tggggacagg gtttgcgggc agcacctaaa 720
aagcaaaaga aacatacggt aagttaaca cctgatacaa cgctttataa tgctgctcag 780
attattttgtg cgaactatgg tgaagcattt tcagttgata aaaaaggcgg ccaccaccac 840
caccaccact aa 852

<210> 136

<211> 283

<212> PRT

<213> Artificial Sequence

<220>

<223> LVL312

<400> 136

Met Ile Lys Phe Leu Ser Ala Leu Ile Leu Leu Val Thr Thr Ala
1 5 10 15
Ala Gln Ala Glu Thr Lys Lys Ala Ala Val Ser Glu Leu Leu Gln Ala
20 25 30
Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr Asn
35 40 45
Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp Ile
50 55 60
Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Ser Asn Gly Ala
65 70 75 80
Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile Leu

petca2012050250 seq1																
85					90					95						
Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr	Thr	Thr	Cys	
			100				105						110			
Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys	Gly	Ser	Val	
			115				120						125			
Thr	Gln	Gly	Gly	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	
			130				135						140			
Leu	Ala	Pro	Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	
145				150				155						160		
Asn	Val	Asn	Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	
			165				170						175			
Glu	Pro	Gln	Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	
			180				185						190			
Leu	Tyr	Val	Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	
			195				200						205			
Tyr	Lys	Ile	Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	
			210				215						220			
Asp	Phe	Tyr	Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	
225				230				235						240		
Lys	Gln	Lys	Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	
			245				250						255			
Asn	Ala	Ala	Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	
			260				265						270			
Asp	Lys	Lys	Gly	Gly	His	His	His	His	His							
			275				280									

<210> 137
<211> 855
<212> DNA
<213> Artificial Sequence

<220>
<223> LVL291

<400>	137						
atgaaatacc	tgctgccgac	cgctgctgct	ggtctgctgc	tcctcgctgc	ccagccggcg	60	
atggcccaga	ttcagaaggc	tgaacaaaat	gatgtgaagc	tggcacgcc	gactgatgta	120	
cgaaggcgat	atatacgttt	ggtaaagaat	gtgaattatt	acatcgatag	tgaatcgatc	180	
tggttggtata	accaagagcc	acaaattgta	catthtgatg	cagtggtgaa	tttagataag	240	
ggattgtatg	tttatcctga	gcctaaacgt	tatgcacggt	ctgttctgtca	gtataagatc	300	
ttgaatttgtg	caaattatca	tttaactcaa	gtacgaactg	attttctatga	tgaatttttg	360	
ggacagggtt	tgcgggcagc	acctaataag	caaaagaaac	atacgttaag	tttaacacct	420	
gatacaacgc	tttataatgc	tgctcagatt	attttgtcga	actatggtga	agcattttca	480	
gttgataaaa	aaggcggcac	taaaaaagca	gcggtatctg	aattactgca	agcgtcagcg	540	
ccttataaagg	ctgatgtgga	attatgtgta	tatagcaca	atgaaacaac	aaactgtacg	600	
ggtggaaaaa	attggtattgc	agcagatata	accacagcaa	aaggctatgt	aaatcagtg	660	
accaacaagca	acgggtgcaat	aacagtaaaa	ggggatggca	cattggcaaa	tatggaatat	720	
attttgcaag	ctacaggtaa	tgctgcaaca	ggtgtaactt	ggacaacaac	ttgcaaagga	780	
accgatgcct	ctttattttcc	agcaaattht	tgcggaagtg	tcacacaagg	cggccaccac	840	
caccaccacc	actaa					855	

<210>	138
<211>	284
<212>	PRT
<213>	Artificial Sequence

<220>
<223> LVL291

<400> 138															
Met	Lys	Tyr	Leu	Leu	Pro	Thr	Ala	Ala	Ala	Gly	Leu	Leu	Leu	Leu	Ala
1				5					10					15	
Ala	Gln	Pro	Ala	Met	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val
			20					25					30		
Lys	Leu	Ala	Pro	Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val
		35					40					45			
Lys	Asn	Val	Asn	Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn

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

<210> 139
 <211> 852
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL268

<400> 139
 atgaaatacc tgcctgccgac cgctgctgct ggtctgctgc tcctcgcctgc ccagccggcg 60
 atggccgata ttcagaaggc tgaacaaaat gatgtgaagc tggcaccgcc gactgatgta 120
 cgaagcggat atatacgttt ggtaaagaat gtgaattatt acatcgatag tgaatcgatc 180
 tgggtggata accaagagcc acaaattgta ctttttgatg cagtgggtgaa tttagataag 240
 ggattgtatg tttatcctga gcctaaacgt tatgcacgtt ctgttcgtca gtataagatc 300
 ttgaattgtg caaattatca ttaactcaa gtacgaactg atttctatga tgaattttgg 360
 ggacagggtt tgcgggcagc acctaaaaag caaaagaaac atacgttaag ttaaacacct 420
 gatacaacgc tttataatgc tgctcagatt atttgtgcga actatgggtga agcattttca 480
 gttgataaaa aaggcggcac taaaaaagca gcggtatctg aattactgca agcgtcagcg 540
 ccttataagg ctgatgtgga attatgtgta tatagcacia atgaaacaac aaactgtacg 600
 ggtggaaaaa atggtattgc agcagatata accacagcaa aaggctatgt aaaatcagtg 660
 acaacaagca acggtgcaat aacagtaaaa ggggatggca cattggcaaa tatggaatat 720
 attttgcaag ctacaggtaa tgctgcaaca ggtgtaactt ggacaacaac ttgcaaagga 780
 acggatgcct ctttatttcc agcaaatttt tgcggaagtg tcacacaagg cggccaccac 840
 caccaccacc ac 852

<210> 140
 <211> 284
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL268

<400> 140
 Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Ala
 1 5 10 15
 Ala Gln Pro Ala Met Ala Asp Ile Gln Lys Ala Glu Gln Asn Asp Val

pctca2012050236-seq1

<400> 142

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Met Lys His Phe Pro Ser Lys Val Leu Thr Thr Ala Ile Leu Ala Thr
 1      5      10      15
Phe Cys Ser Gly Ala Leu Ala Ala Thr Asn Asp Asp Asp Lys Ala Glu
 20      25      30
Gln Asn Asp Val Lys Leu Ala Pro Thr Asp Val Arg Ser Gly Tyr
 35      40      45
Ile Arg Leu Val Lys Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile
 50      55      60
Trp Val Asp Asn Gln Glu Pro Gln Ile Val His Phe Asp Ala Val Val
 65      70      75      80
Asn Leu Asp Lys Gly Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala
 85      90      95
Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu
100      105      110
Thr Gln Val Arg Thr Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu
115      120      125
Arg Ala Ala Pro Lys Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro
130      135      140
Asp Thr Thr Leu Tyr Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly
145      150      155      160
Glu Ala Phe Ser Val Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val
165      170      175
Ser Glu Leu Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu
180      185      190
Cys Val Tyr Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn
195      200      205
Gly Ile Ala Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val
210      215      220
Thr Thr Ser Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala
225      230      235      240
Asn Met Glu Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val
245      250      255
Thr Trp Thr Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala
260      265      270
Asn Phe Cys Gly Ser Val Thr Gln Gly Gly His His His His His His
275      280      285

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<210> 143

<211> 792

<212> DNA

<213> Artificial Sequence

<220>

<223> LVL270

<400> 143

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atgcaccacc accaccacca cagcgcgcag attcagaagg ctgaacaaaa tgatgtgaag 60
ctggcaccgc cgactgatgt acgaagcgga tatatacgtt tggtaaagaa tgtgaattat 120
tacatcgata gtgaatcgat ctgggtggat aaccaagagc cacaaattgt acattttgat 180
gcagtgggtga atttagataa gggattgtat gtttatcctg agcctaaacg ttatgcacgt 240
tctgttcgtc agtataagat ctggaattgt gcaaattatc atttaactca agtacgaact 300
gattttctatg atgaattttg gggacagggt ttgcgggcag cacctaaaaa gcaaaaagaaa 360
catacgttaa gtttaacacc tgatacaacg ctttataatg ctgctcagat tatttgtgcg 420
aactatggtg aagcattttc agttgataaa aaaggcggca ctaaaaaagc agcggtatct 480
gaattactgc aagcgtcagc gccttataag gctgatgtgg aattatgtgt atatagcaca 540
aatgaaacaa caaactgtac ggggtggaaaa aatggtattg cagcagatat aaccacagca 600
aaaggctatg taaaatcagt gacaacaagc aacggtgcaa taacagtaaa aggggatggc 660
acattggcaa atatggaata tattttgcaa gctacaggta atgctgcaac aggtgtaact 720
tggaacaaca cttgcaaagg aacggatgcc tctttatttc cagcaaattt ttgcggaagt 780
gtcacacaat aa                                     792

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<210> 144

<211> 263

<212> PRT

<213> Artificial Sequence

pctca2012050236-seq1

<220>

<223> LVL270

<400> 144

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Met His His His His His Ser Ala Gln Ile Gln Lys Ala Glu Gln
 1      5      10      15
Asn Asp Val Lys Leu Ala Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile
 20      25      30
Arg Leu Val Lys Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp
 35      40      45
Val Asp Asn Gln Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn
 50      55      60
Leu Asp Lys Gly Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg
 65      70      75      80
Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr
 85      90      95
Gln Val Arg Thr Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg
100      105      110
Ala Ala Pro Lys Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp
115      120      125
Thr Thr Leu Tyr Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu
130      135      140
Ala Phe Ser Val Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser
145      150      155      160
Glu Leu Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys
165      170      175
Val Tyr Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly
180      185      190
Ile Ala Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr
195      200      205
Thr Ser Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn
210      215      220
Met Glu Tyr Ile Leu Gln Ala Thr Gly Asn Ala Thr Gly Val Thr
225      230      235      240
Trp Thr Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn
245      250      255
Phe Cys Gly Ser Val Thr Gln
260

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<210> 145

<211> 852

<212> DNA

<213> Artificial Sequence

<220>

<223> LVL315

<400> 145

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atgaaatacc tgctgccgac cgctgctgct ggtctgctgc tcctcgctgc ccagccggcg 60
atggccatgg ataaggctga acaaaatgat gtgaagctgg caccgccgac tgatgtacga 120
agcggatata tacgttttgg aaagaatgtg aattattaca tcgatagtga atcgatctgg 180
gtggataacc aagagccaca aattgtacat tttgatgcag tgggtgaattt agataaggga 240
ttgtatgttt atcctgagcc taaacgttat gcacgttctg ttcgtcagta taagatcttg 300
aattgtgcaa attatcattt aactcaagta cgaactgatt tctatgatga attttgggga 360
cagggtttgc gggcagcacc taaaaagcaa aagaaacata cgtaaagttt aacacctgat 420
acaacgcctt ataatgctgc tcagattatt tgtgcgaact atgggtgaagc attttcagtt 480
gataaaaaag gcggcactaa aaaagcagcg gtatctgaat tactgcaagc gtcagcgct 540
tataaggctg atgtggaatt atgtgtatat agcacaatg aaacaacaaa ctgtacgggt 600
ggaaaaaatg gtattgcagc agatataacc acagcaaaag gctatgtaaa atcagtgaac 660
acaagcaacg gtgcaatac agtaaaaggg gatggcacat tggcaaatat ggaatatatt 720
ttgcaagcta caggtaatgc tgcaacaggt gtaacttggg caacaacttg caaagggaacg 780
gatgcctctt tatttccagc aaatttttgc ggaagtgtca cacaaggcgg ccaccaccac 840
caccaccact aa                                     852

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<210> 146

<211> 283

<212> PRT

<213> Artificial Sequence

<220>

<223> LVL315

<400> 146

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Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
 1      5      10      15
Ala Gln Pro Ala Met Ala Met Asp Lys Ala Glu Gln Asn Asp Val Lys
 20      25      30
Leu Ala Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys
 35      40      45
Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln
 50      55      60
Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly
 65      70      75      80
Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln
 85      90      95
Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr
 100     105     110
Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys
 115     120     125
Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr
 130     135     140
Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val
 145     150     155     160
Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu Leu Leu Gln
 165     170     175
Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr
 180     185     190
Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp
 195     200     205
Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser Asn Gly
 210     215     220
Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile
 225     230     235     240
Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr Thr Thr
 245     250     255
Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser
 260     265     270
Val Thr Gln Gly Gly His His His His His
 275     280

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<210> 147

<211> 831

<212> DNA

<213> Artificial Sequence

<220>

<223> LVL317

<400> 147

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atgaaatacc tgctgccgac cgctgctgct ggtctgctgc tcctcgctgc ccagccggcg 60
atggcccaga ttcagaaggc tgaacaaaat gatgtgaagc tggcaccgcc gactgatgta 120
cgaagcggat atatacgttt ggtaaagaat gtgaattatt acatcgatag tgaatcgatc 180
tgggtggata accaagagcc acaaattgta cattttgatg cagtggtgaa ttagataaag 240
ggattgtatg tttatcctga gcctaaacgt tatgcacgtt ctgttcgtca gtataagatc 300
ttgaattgtg caaattatca tttaactcaa gtacgaactg atttctatga tgaattttgg 360
ggacaggggt tgcgggcagc acctaaaaag caaaagaaac atacgttaag ttaaacacct 420
gatacaacgc tttataatgc tgctcagatt atttgtgcga actatgggtg agcattttta 480
gttgataaaa aaggcggcac taaaaaagca gcggtatctg aattactgca agcgtcagcg 540
ccttataagg ctgatgtgga attatgtgta tatagcacia atgaaacaac aaactgtacg 600
ggtggaaaaa atggtattgc agcagatata accacagcaa aaggctatgt aaaatcagtg 660
acaacaagca acggtgcaat aacagtaaaa ggggatggca cattggcaaa tatggaatat 720
attttgcaag ctacaggtaa tgctgcaaca ggtgtaactt ggacaacaac ttgcaaagga 780
acggatgcct ctttatttcc agcaaathtt tgcggaagtg tcacacaata a 831

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<210> 148
 <211> 276
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL317

<400> 148
 Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
 1 5 10 15
 Ala Gln Pro Ala Met Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val
 20 25 30
 Lys Leu Ala Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val
 35 40 45
 Lys Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn
 50 55 60
 Gln Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys
 65 70 75 80
 Gly Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg
 85 90 95
 Gln Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg
 100 105 110
 Thr Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro
 115 120 125
 Lys Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu
 130 135 140
 Tyr Asn Ala Ala Gln Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser
 145 150 155 160
 Val Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu Leu Leu
 165 170 175
 Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser
 180 185 190
 Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala
 195 200 205
 Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser Asn
 210 215 220
 Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr
 225 230 235 240
 Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr Thr
 245 250 255
 Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly
 260 265 270
 Ser Val Thr Gln
 275

<210> 149
 <211> 828
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL318

<400> 149
 atgaaatacc tgctgccgac cgctgctgct ggtctgctgc tcctcgctgc ccagccggcg 60
 atggccatgg ataaggctga acaaaatgat gtgaagctgg caccgccgac tgatgtacga 120
 agcggatata tacgttttgt aaagaatgtg aattattaca tcgatagtga atcgatctgg 180
 gtggataacc aagagccaca aattgtacat ttgtatgcag tgggtgaattt agataaggga 240
 ttgtatgttt atcctgagcc taaacgttat gcacgttctg ttcgtcagta taagatcttg 300
 aattgtgcaa attatcattt aactcaagta cgaactgatt tctatgatga attttgggga 360
 cagggtttgc gggcagcacc taaaaagcaa aagaaacata cgttaagttt aacacctgat 420
 acaacgcttt ataatgctgc tcagattatt tgtgcgaact atgggtgaagc attttcagtt 480
 gataaaaaag gcggcactaa aaaagcagcg gtatctgaat tactgcaagc gtcagcgctt 540
 tataaggctg atgtggaatt atgtgtatat agcacaaatg aaacaacaaa ctgtacgggt 600
 ggaaaaaatg gtattgcagc agatataacc acagcaaaag gctatgtaaa atcagtgaca 660
 acaagcaacg gtgcaataac agtaaaaggg gatggcacat tggcaaatat ggaatatatt 720

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ttgcaagcta caggtaatgc tgcaacaggt gtaacttggg caacaacttg caaaggaacg 780
 gatgcctctt tatttccagc aaatttttgc ggaagtgtca cacaataa 828

<210> 150
 <211> 275
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL318

<400> 150
 Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
 1 5 10 15
 Ala Gln Pro Ala Met Ala Met Asp Lys Ala Glu Gln Asn Asp Val Lys
 20 25 30
 Leu Ala Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys
 35 40 45
 Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln
 50 55 60
 Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly
 65 70 75 80
 Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln
 85 90 95
 Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr
 100 105 110
 Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys
 115 120 125
 Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr
 130 135 140
 Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val
 145 150 155 160
 Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu Leu Leu Gln
 165 170 175
 Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr
 180 185 190
 Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp
 195 200 205
 Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser Asn Gly
 210 215 220
 Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile
 225 230 235 240
 Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr Thr Thr
 245 250 255
 Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser
 260 265 270
 Val Thr Gln
 275

<210> 151
 <211> 483
 <212> DNA
 <213> Haemophilus influenzae

<400> 151
 atgaaaaaaa ttattttaac attatcactt gggttactta ccgcttggtc tgctcaaadc 60
 caaaaggctg aacaaaatga tgtgaagctg gcaccgccga ctgatgtacg aagcggatat 120
 atacgtttgg taaagaatgt gaattattac atcgatagtg aatcgatctg ggtggataac 180
 caagagccac aaattgtaca ttttgatgct gtgggtgaatt tagatagggg attgtatggt 240
 tatctgagc ctaaacgtta tgcacgttct gttcgtcagt ataagatttt gaattgtgca 300
 aattatcatt taactcaaat acgaactgat ttctatgatg aattttgggg acagggtttg 360
 cgggcagcac ctaaaaagca aaagaaacat acgttaagtt taacacctga tacaacgctt 420
 tataatgctg ctacagattat ttgtgcaaat tatggtaaag cattttcagt tgataaaaaa 480
 taa 483

<210> 152
 <211> 160

pctca2012050236-seq1

<212> PRT

<213> Haemophilus influenzae

<400> 152

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Arg Gly Leu Tyr Val
 65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Ile Arg Thr Asp Phe Tyr
100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Lys Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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<210> 153

<211> 480

<212> DNA

<213> Haemophilus influenzae

<400> 153

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atgaaaaaaa ttattttaac attatcactt gggttactta ctgcctgttc tgctcaaadc 60
caaaaggcta aacaaaatga tgtgaagctg gcaccgccga ctgatgtacg aagcggatat 120
atacgttttg taaagaatgt gaattattac atcgatagtg aatcgatctg ggtggataac 180
caagagccac aaattgtaca ttttgatgca gtgggtgaatt tagataaggg attgtatggt 240
tatcctgagc ctaaactgta tgcacgttct gttcgtcagt ataagatctt gaattgtgca 300
aattatcatt taactcaagt acgaactgat ttctatgatg aattttgggg acaggggttg 360
cgggcagcac ctaaaaagca aaagaaacat acgttaagtt taacacctga tacaacgctt 420
tataatgctg ctcagattat ttgtgcgaac tatgggtgaag cattttcagt tgataaaaaa 480

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<210> 154

<211> 160

<212> PRT

<213> Haemophilus influenzae

<400> 154

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Met Lys Lys Ile Ile Leu Thr Leu Ser Leu Gly Leu Leu Thr Ala Cys
 1      5      10      15
Ser Ala Gln Ile Gln Lys Ala Lys Gln Asn Asp Val Lys Leu Ala Pro
 20      25      30
Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn
 35      40      45
Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln
 50      55      60
Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val
 65      70      75      80
Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile
 85      90      95
Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr
100      105      110
Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys
115      120      125
Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala
130      135      140
Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
145      150      155      160

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pctca2012050236-seq1

<210> 155
<211> 91
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 155
cacacacata tgattaaatt tctctctgca ttaattcttc tactgggtcac gacggcggct 60
caggctgaga ctaaaaaagc agcggatatct g 91

<210> 156
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 156
tgtgtgaagc ttttagtggt ggtggtggtg gtggccgcct tgtgtgacac ttccgcaaaa 60
atttgc 66

<210> 157
<211> 58
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 157
tttgcggaag tgtcacacaa ggcggcgcgcg agattcagaa ggctgaacaa aatgatgt 58

<210> 158
<211> 58
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 158
acatcathtt gttcagcctt ctgaatctgc gcgcccgcctt gtgtgacact tccgcaaa 58

<210> 159
<211> 59
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 159
tgtgtgaagc ttttagtggt ggtggtggtg gtggccgcct tttttatcaa ctgaaaatg 59

<210> 160
<211> 65
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 160

pctca2012050236-seq1

cacacacata tgcaccacca ccaccaccac agcgcgcaga ttcagaaggc tgaacaaaat 60
gatgt 65

<210> 161
<211> 46
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 161
cattttcagt tgataaaaaa ggcggcacta aaaaagcagc ggtatc 46

<210> 162
<211> 46
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 162
gataccgctg cttttttagt gccgcctttt ttatcaactg aaaatg 46

<210> 163
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 163
tgtgtgaagc tttttattgtg tgacacttcc gcaaa 35

<210> 164
<211> 104
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 164
cacacacata tgaaatacct gctgccgacc gctgctgctg gtctgctgct cctcgctgcc 60
cagccggcga tggcccagat tcagaaggct gaacaaaatg atgt 104

<210> 165
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 165
gcattttcag ttgataaaaa aggcggcact aaaaaagcag cggtatctg 49

<210> 166
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> primer

<400> 166

pctca2012050236-seq1

cagataccgc tgctttttta gtgccgcctt ttttatcaac tgaaaatgc 49

<210> 167
 <211> 104
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 167
 cacacacata tgaaatacct gctgccgacc gctgctgctg gtctgctgct cctcgctgcc 60
 cagccggcga tggccgatat tcagaaggct gaacaaaatg atgt 104

<210> 168
 <211> 115
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 168
 cacacacata tgaaacactt tccatccaaa gtactgacca cagccatcct tgccactttc 60
 tgtagcggcg cactggcagc cacaacgac gacgataagg ctgaacaaaa tgatg 115

<210> 169
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 169
 gccggcgatg gccatggata aggctgaaca aaatg 35

<210> 170
 <211> 35
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 170
 cattttgttc agccttatcc atggccatcg ccggc 35

<210> 171
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 171
 ggaagtgtca cacaataagg cggccaccac cacc 34

<210> 172
 <211> 34
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 172

pctca2012050236-seq1
 ggtggtggtg gccgccttat tgtgtgacac ttcc 34

<210> 173
 <211> 54
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 173
 gaattccata tgcacccatca ccatacccat actaaaaaag cagcggatc tgaa 54

<210> 174
 <211> 32
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 174
 gcgcccgtcg agtcattgtg tgacacttcc gc 32

<210> 175
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 175
 gcccagccgg cgatggccca gatccagaag gctgaacaaa atg 43

<210> 176
 <211> 43
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> primer

<400> 176
 cattttgttc agccttctgg atctgggccca tcgccggctg ggc 43

<210> 177
 <211> 254
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Fusion protein

<400> 177
 Gln Ile Gln Lys Ala Glu Gln Asn Asp Val Lys Leu Ala Pro Pro Thr
 1 5 10 15
 Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn Tyr Tyr
 20 25 30
 Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln Ile Val
 35 40 45
 His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val Tyr Pro
 50 55 60
 Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn
 65 70 75 80
 Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp Glu
 85 90 95
 Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys His

pctca2012050236-seq1

Thr	Leu	Ser	100	Leu	Thr	Pro	Asp	Thr	105	Thr	Leu	Tyr	Asn	Ala	110	Ala	Gln	Ile
Ile	Cys	Ala	115	Asn	Tyr	Gly	Glu	Ala	120	Phe	Ser	Val	Asp	Lys	125	Lys	Gly	Gly
Thr	Lys	Lys	130	Ala	Ala	Val	135	Ser	Glu	Leu	Leu	Gln	Ala	Ser	140	Ala	Pro	Tyr
145	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr	Ser	Thr	Asn	Glu	Thr	155	Thr	Asn	160
Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala	165	Ala	Asp	Ile	Thr	Thr	170	Ala	Lys	175
Gly	Tyr	Val	180	Lys	Ser	Val	Thr	Thr	185	Ser	Asn	Gly	Ala	Ile	190	Thr	Val	Lys
Gly	Asp	Gly	195	Thr	Leu	Ala	Asn	Met	200	Glu	Tyr	Ile	Leu	Gln	205	Ala	Thr	Gly
Asn	Ala	Ala	210	Thr	Gly	Val	215	Thr	Trp	Thr	Thr	Thr	Cys	Lys	220	Gly	Thr	Asp
225	Ala	Ser	Leu	Phe	Pro	Ala	230	Asn	Phe	Cys	Gly	Ser	Val	Thr	235	Gln		240
				245							250							

<210> 178
 <211> 6
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic construct

<400> 178
 Ala Thr Asn Asp Asp Asp
 1 5

<210> 179
 <211> 138
 <212> PRT
 <213> Haemophilus influenzae

<400> 179
 Ala Glu Gln Asn Asp Val Lys Leu Ala Pro Pro Thr Asp Val Arg Ser
 1 5 10 15
 Gly Tyr Ile Arg Leu Val Lys Asn Val Asn Tyr Tyr Ile Asp Ser Glu
 20 25 30
 Ser Ile Trp Val Asp Asn Gln Glu Pro Gln Ile Val His Phe Asp Ala
 35 40 45
 Val Val Asn Leu Asp Lys Gly Leu Tyr Val Tyr Pro Glu Pro Lys Arg
 50 55 60
 Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys Ala Asn Tyr
 65 70 75 80
 His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp Glu Phe Trp Gly Gln
 85 90 95
 Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys His Thr Leu Ser Leu
 100 105 110
 Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala Gln Ile Ile Cys Ala Asn
 115 120 125
 Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys
 130 135

<210> 180
 <211> 137
 <212> PRT
 <213> Haemophilus influenzae

<400> 180
 Glu Gln Asn Asp Val Lys Leu Ala Pro Pro Thr Asp Val Arg Ser Gly
 1 5 10 15

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Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn	Tyr	Tyr	Ile	Asp	Ser	Glu	Ser
			20					25				30			
Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln	Ile	Val	His	Phe	Asp	Ala	Val
		35					40				45				
Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val	Tyr	Pro	Glu	Pro	Lys	Arg	Tyr
		50				55					60				
Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile	Leu	Asn	Cys	Ala	Asn	Tyr	His
65					70				75					80	
Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr	Asp	Glu	Phe	Trp	Gly	Gln	Gly
				85				90					95		
Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys	Lys	His	Thr	Leu	Ser	Leu	Thr
			100				105						110		
Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala	Gln	Ile	Ile	Cys	Ala	Asn	Tyr
		115					120					125			
Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys							
	130					135									

<210> 181
 <211> 849
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL702

<400> 181

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agcggatata	tacgttttgt	aaagaatgtg	aattattaca	tcgatagtga	atcgatctgg	180
gtggataacc	aagagccaca	aattgtacat	tttgatgcag	tggtgaattt	agataaggga	240
ttgtatgttt	atcctgagcc	taaacgttat	gcacgttctg	ttcgtcagta	taagatcttg	300
aattgtgcaa	attatcattt	aactcaagta	cgaactgatt	tctatgatga	atthtgggga	360
cagggtttgc	gggcagcacc	taaaaagcaa	aagaaacata	cgtaaagttt	aacacctgat	420
acaacgcttt	ataatgctgc	tcagattatt	tgtgcgaact	atggtgaagc	atthtcagtt	480
gataaaaaag	gcggcactaa	aaaagcagcg	gtatctgaat	tactgcaagc	gtcagcgcct	540
tataaggctg	atgtggaatt	atgtgtatat	agcacaatg	aaacaacaaa	ctgtacgggt	600
ggaaaaaatg	gtattgcagc	agatataacc	acagcaaaag	gctatgtaaa	atcagtgaca	660
acaagcaacg	gtgcaataac	agtaaaagg	gatggcacat	tggcaaatat	ggaatatatt	720
ttgcaagcta	caggtaatgc	tgcaacaggt	gtaacttgga	caacaacttg	caaaggaacg	780
gatgcctctt	tatttccagc	aaatttttgc	ggaagtgtca	cacaaggcgg	ccaccaccac	840
caccaccac						849

<210> 182
 <211> 283
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL702

<400> 182

Met	Lys	Tyr	Leu	Leu	Pro	Thr	Ala	Ala	Ala	Gly	Leu	Leu	Leu	Leu	Ala
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Ala	Gln	Pro	Ala	Met	Ala	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys
			20					25					30		
Leu	Ala	Pro	Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys
		35				40						45			
Asn	Val	Asn	Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln
	50				55						60				
Glu	Pro	Gln	Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly
65				70					75					80	
Leu	Tyr	Val	Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln
				85				90					95		
Tyr	Lys	Ile	Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr
			100				105						110		
Asp	Phe	Tyr	Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys
	115						120					125			

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

<210> 183
 <211> 858
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL736

<400> 183

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gatgtacgaa	gcggatatat	acgtttggta	aagaatgtga	attattacat	cgatagtga	180
tcgatctggg	tggaatacca	agagccacaa	attgtacatt	ttgatgcagt	gggtgaattta	240
gataagggat	tgtatgttta	tcctgagcct	aaacgttatg	cacgttctgt	tcgtcagtat	300
aagatcttga	attgtgcaaa	ttatcattta	actcaagtac	gaactgattt	ctatgatgaa	360
ttttggggac	agggtttgcg	ggcagcacct	aaaaagcaaa	agaaacatac	gttaagttta	420
acacctgata	caacgcttta	taatgctgct	cagattatgt	gtgcgaacta	tggtgaagca	480
ttttcagttg	ataaaaaagg	cggcactaaa	aaagcagcgg	tatctgaatt	actgcaagcg	540
tcagcgctt	ataaggctga	tgtggaatta	tgtgtatata	gcacaaatga	aacaacaaac	600
tgtacgggtg	gaaaaaatgg	tattgcagca	gatataacca	cagcaaaagg	ctatgtaaaa	660
tcagtacaa	caagcaacgg	tgcaataaca	gtaaaagggg	atggcacatt	ggcaaatatg	720
gaatatattt	tgcaagctac	aggtaatgct	gcaacagggtg	taacttggac	aacaacttgc	780
aaaggaacgg	atgcctcttt	atttccagca	aatttttgcg	gaagtgtcac	acaaggcggc	840
caccaccacc	accaccac					858

<210> 184
 <211> 286
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL736

<400> 184

Met	Lys	Tyr	Leu	Leu	Pro	Thr	Ala	Ala	Ala	Gly	Leu	Leu	Leu	Leu	Ala
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Ala	Gln	Pro	Ala	Met	Ala	Ser	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn
		20						25					30		
Asp	Val	Lys	Leu	Ala	Pro	Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg
		35					40					45			
Leu	Val	Lys	Asn	Val	Asn	Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val
	50				55					60					
Asp	Asn	Gln	Glu	Pro	Gln	Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu
65					70					75				80	
Asp	Lys	Gly	Leu	Tyr	Val	Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser
			85					90						95	

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Val	Arg	Gln	Tyr	Lys	Ile	Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln
			100					105					110		
Val	Arg	Thr	Asp	Phe	Tyr	Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala
		115					120				125				
Ala	Pro	Lys	Lys	Gln	Lys	Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr
	130					135					140				
Thr	Leu	Tyr	Asn	Ala	Ala	Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala
	145				150					155					160
Phe	Ser	Val	Asp	Lys	Lys	Gly	Gly	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu
				165					170					175	
Leu	Leu	Gln	Ala	Ser	Ala	Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val
			180					185					190		
Tyr	Ser	Thr	Asn	Glu	Thr	Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile
		195					200					205			
Ala	Ala	Asp	Ile	Thr	Thr	Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr
	210					215					220				
Ser	Asn	Gly	Ala	Ile	Thr	Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met
	225				230				235						240
Glu	Tyr	Ile	Leu	Gln	Ala	Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp
			245					250						255	
Thr	Thr	Thr	Cys	Lys	Gly	Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe
			260					265					270		
Cys	Gly	Ser	Val	Thr	Gln	Gly	Gly	His	His	His	His	His	His		
		275					280						285		

<210> 185
 <211> 855
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL737

<400> 185

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gtacgaagcg	gatataacg	tttggtaaag	aatgtgaatt	attacatcga	tagtgaatcg	180
atctgggtgg	ataaccaaga	gccacaaatt	gtacattttg	atgcagtggg	gaatttagat	240
aagggtattgt	atgtttatcc	tgagcctaaa	cgttatgcac	gttctgttcg	tcagtataag	300
atcttgaatt	gtgcaaatta	tcatttaact	caagtacgaa	ctgatttcta	tgatgaattt	360
tggggacagg	gtttgcgggc	agcacctaaa	aagcaaaaga	aacatacggt	aagtttaaca	420
cctgatacaa	cgctttataa	tgctgctcag	attattttgt	cgaactatgg	tgaagcattt	480
tcagttgata	aaaaaggcgg	cactaaaaaa	gcagcgggtat	ctgaattact	gcaagcgtca	540
gcgccttata	aggctgatgt	ggaattatgt	gtatatagca	caaatgaaac	aacaaactgt	600
acgggtggaa	aaaatggtat	tgcagcagat	ataaccacag	caaaaggcta	tgtaaaatca	660
gtgacaacaa	gcaacggtgc	aataacagta	aaaggggatg	gcacattggc	aaatatggaa	720
tatatatttgc	aagctacagg	taatgctgca	acaggtgtaa	cttggacaac	aacttgcaaa	780
ggaacgggatg	cctctttatt	tccagcaaat	ttttgcggaa	gtgtcacaca	aggcggccac	840
caccaccacc	accac					855

<210> 186
 <211> 285
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL737

<400> 186

Met	Lys	Tyr	Leu	Leu	Pro	Thr	Ala	Ala	Ala	Gly	Leu	Leu	Leu	Ala	Ala
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Ala	Gln	Pro	Ala	Met	Ala	Ala	Gln	Ile	Gln	Lys	Ala	Glu	Gln	Asn	Asp
		20					25					30			
Val	Lys	Leu	Ala	Pro	Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu
		35				40					45				
Val	Lys	Asn	Val	Asn	Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp
	50				55					60					

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

<210> 187
 <211> 843
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL738

<400> 187

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tatatacggt	tggtaaagaa	tgtgaattat	tacatcgata	gtgaatcgat	ctgggtggat	180
aaccaagagc	cacaaattgt	acattttgat	gcagtgggtga	atttagataa	gggattgtat	240
gtttatcctg	agcctaaacg	ttatgcacgt	tctgttcgtc	agtataagat	cttgaattgt	300
gcaaattatc	atttaactca	agtacgaact	gatttctatg	atgaattttg	gggacagggg	360
ttgcgggagc	cacctaataa	gcaaaagaaa	catacgttaa	gtttaacacc	tgatacaacg	420
ctttataatg	ctgctcagat	tattttgtgcg	aactatgggtg	aagcattttc	agttgataaa	480
aaaggcgagg	ctaaaaaagc	agcgggtatct	gaattactgc	aagcgtcagc	gccttataag	540
gctgatgtgg	aattatgtgt	atatagcaca	aatgaaacaa	caaactgtac	gggtggaaaa	600
aatggtattg	cagcagatat	aaccacagca	aaaggctatg	taaaatcagt	gacaacaagc	660
aacggtgcaa	taacagtaaa	aggggatggc	acattggcaa	atatggaata	tattttgcaa	720
gctacaggta	atgctgcaac	aggtgtaact	tggacaacaa	cttgcaaagg	aacggatgcc	780
tctttatttc	cagcaaat	ttgcggaagt	gtcacacaag	gcggccacca	ccaccaccac	840
cac						843

<210> 188
 <211> 281
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL738

<400> 188

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Ala	Gln	Pro	Ala	Met	Ala	Lys	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala
		20						25					30		

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

<210> 189
 <211> 840
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL739

<400> 189

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atacgttttg	taaagaatgt	gaattattac	atcgatagtg	aatcgatctg	ggtggataac	180
caagagccac	aaattgtaca	ttttgatgca	gtggtgaatt	tagataaggg	attgtatggt	240
tatcctgagc	ctaaacgtta	tgcacgttct	gttcgctcagt	ataagatctt	gaattgtgca	300
aattatcatt	taactcaagt	acgaactgat	ttctatgatg	aattttgggg	acagggtttg	360
cgggcagcac	ctaaaaagca	aaagaaacat	acgttaagtt	taacacctga	tacaacgctt	420
tataatgctg	ctcagattat	ttgtgcgaac	tatggtgaag	cattttcagt	tgataaaaaa	480
ggcggcacta	aaaaagcagc	ggtatctgaa	ttactgcaag	cgtcagcgcc	ttataaggct	540
gatgtggaat	tatgtgtata	tagcacaaat	gaaacaacaa	actgtacggg	tggaaaaaat	600
ggtattgcag	cagatataac	cacagcaaaa	ggctatgtaa	aatcagtgac	aacaagcaac	660
ggtgcaataa	cagtaaaagg	ggatggcaca	ttggcaataa	tggaaatatat	tttgcaagct	720
acaggtaatg	ctgcaacagg	tgtaaacttg	acaacaactt	gcaaagggaac	ggatgctctt	780
ttattttccag	caaatttttg	cggaagtgtc	acacaaggcg	gccaccacca	ccaccaccac	840

<210> 190
 <211> 280
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL739

<400> 190

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Met	Lys	Tyr	Leu	Leu	Pro	Thr	Ala	Ala	Gly	Leu	Leu	Leu	Ala
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Ala	Gln	Pro	Ala	Met	Ala	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu
		20					25					30	Ala
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn
		35					40					45	Val
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu
	50					55				60			Pro
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu
65					70				75				Tyr
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr
				85					90				Lys
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp
		100						105				110	Phe
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Gln
		115					120					125	Lys
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn
	130					135					140		Ala
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp
145					150				155				Lys
Gly	Gly	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu	Leu	Gln	Ala
			165					170					Ser
Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr	Ser	Thr	Asn
		180						185				190	Glu
Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala	Ala	Asp	Ile
	195						200					205	Thr
Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser	Asn	Gly	Ala
	210					215					220		Ile
Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu	Tyr	Ile	Leu
225					230				235				Gln
Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr	Thr	Thr	Cys
			245						250				Lys
Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys	Gly	Ser	Val
		260						265					270
Gly	Gly	His	His	His	His	His	His						Gln
	275						280						

<210> 191
 <211> 837
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL740

<400> 191

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cgtttggtaa	agaatgtgaa	ttattacatc	gatagtgaat	cgatctgggt	ggataaccaa	180
gagccacaaa	ttgtacattt	tgatgcagtg	gtgaatttag	ataagggatt	gtatgtttat	240
cctgagccta	aacgttatgc	acgttctgtt	cgtcagtata	agatcttgaa	ttgtgcaaat	300
tatcatttaa	ctcaagtacg	aactgatttc	tatgatgaat	tttggggaca	gggtttgcgg	360
gcagcaccta	aaaagcaaaa	gaaacatacg	ttaagtttaa	cacctgatac	aacgctttat	420
aatgctgctc	agattatttg	tgcgaaactat	ggtgaagcat	tttcagttga	taaaaaaggc	480
ggcactaaaa	aagcagcggt	atctgaatta	ctgcaagcgt	cagcgctta	taaggctgat	540
gtggaattat	gtgtatatag	cacaaatgaa	acaacaaact	gtacgggtgg	aaaaaatggt	600
attgcagcag	atataaccac	agcaaaaaggc	tatgtaaaat	cagtgaacaac	aagcaacggt	660
gcaataacag	taaaaggggg	tggcacattg	gcaaatatgg	aatatatttt	gcaagctaca	720
ggtaatgctg	caacaggtgt	aacttggaca	acaacttgca	aaggaacgga	tgctctttta	780
tttccagcaa	atttttgcgg	aagtgtcaca	caaggcggcc	accaccacca	ccaccac	837

<210> 192
 <211> 279
 <212> PRT
 <213> Artificial Sequence

<220>

pctca2012050236-seq1

<223> LVL740

<400> 192

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Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
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Ala Gln Pro Ala Met Ala Glu Gln Asn Asp Val Lys Leu Ala Pro Pro
 20      25      30
Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val Asn Tyr
 35      40      45
Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln Ile
 50      55      60
Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val Tyr
 65      70      75      80
Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu
 85      90      95
Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp
100      105      110
Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys
115      120      125
His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala Gln
130      135      140
Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys Gly
145      150      155      160
Gly Thr Lys Lys Ala Val Ser Glu Leu Leu Gln Ala Ser Ala Pro
165      170      175
Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr Asn Glu Thr Thr
180      185      190
Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp Ile Thr Thr Ala
195      200      205
Lys Gly Tyr Val Lys Ser Val Thr Thr Ser Asn Gly Ala Ile Thr Val
210      215      220
Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile Leu Gln Ala Thr
225      230      235      240
Gly Asn Ala Ala Thr Gly Val Thr Trp Thr Thr Thr Cys Lys Gly Thr
245      250      255
Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser Val Thr Gln Gly
260      265      270
Gly His His His His His
275

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<210> 193

<211> 825

<212> DNA

<213> Artificial Sequence

<220>

<223> LVL735

<400> 193

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agcggatata tacgtttggt aaagaatgtg aattattaca tcgatagtga atcgatctgg 180
gtgggataacc aagagccaca aattgtacat tttgatgcag tgggtgaattt agataagggg 240
ttgtatgttt atcctgagcc taaacgttat gcacgttctg ttcgtcagta taagatcttg 300
aattgtgcaa attatcattt aactcaagta cgaactgatt tctatgatga attttggggg 360
cagggtttgc gggcagcacc taaaaagcaa aagaaacata cggttaagttt aacacctgat 420
acaacgcttt ataatgctgc tcagattatt tgtcggaact atggtgaagc attttcagtt 480
gataaaaaag gcggcactaa aaaagcagcg gtatctgaat tactgcaagc gtcagcgctt 540
tataaggctg atgtggaatt atgtgtatat agcacaatg aaacaacaaa ctgtacgggt 600
ggaaaaaatg gtattgcagc agatataacc acagcaaaag gctatgtaaa atcagtgaca 660
acaagcaacg gtgcaataac agtaaaaggg gatggcacat tggcaaatat ggaatatatt 720
ttgcaagcta caggtaatgc tgcaacaggt gtaacttggg caacaacttg caaaggaacg 780
gatgcctctt tatttccagc aaatttttgc ggaagtgtca caca 825

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<210> 194

<211> 275

<212> PRT

<213> Artificial Sequence

<220>

<223> LVL735

<400> 194

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Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
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Ala Gln Pro Ala Met Ala Ile Gln Lys Ala Glu Gln Asn Asp Val Lys
 20      25      30
Leu Ala Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys
 35      40      45
Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln
 50      55      60
Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly
 65      70      75      80
Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln
 85      90      95
Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr
100      105      110
Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys
115      120      125
Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr
130      135      140
Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val
145      150      155      160
Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu Leu Leu Gln
165      170      175
Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr
180      185      190
Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp
195      200      205
Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser Asn Gly
210      215      220
Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile
225      230      235      240
Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr Thr Thr
245      250      255
Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser
260      265      270
Val Thr Gln
275

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<210> 195

<211> 834

<212> DNA

<213> Artificial Sequence

<220>

<223> LVL778

<400> 195

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gatgtacgaa gcggatatat acgtttggta aagaatgtga attattacat cgatagtga 180
tcgatctggg tggataacca agagccacaa attgtacatt ttgatgcagt ggtgaattta 240
gataagggat tgtatgttta tcctgagcct aaacggtatg cacgttctgt tcgtcagtat 300
aagatcctga attgtgcaaa ttatcattta actcaagtac gaactgattt ctatgatgaa 360
ttttggggac aggggtttgcg ggcagcacct aaaaagcaaa agaaacatac gttaagttaa 420
acacctgata caacgcttta taatgctgct cagattattt gtgcgaacta tggatgaagca 480
ttttcagttg ataaaaaagg cggcactaaa aaagcagcgg tatctgaatt actgcaagcg 540
tcagcgcttt ataaggctga tgtggaatta tgtgtatata gcacaaatga aacaacaaac 600
tgtacgggtg gaaaaaatgg tattgcagca gatataacca cagcaaaagg ctatgtaaaa 660
tcagtgcaca caagcaacgg tgcaataaca gtaaaagggg atggcacatt ggcaaatatg 720
gaatatatth tgcaagctac aggtaatgct gcaacagggtg taacttggac aacaacttgc 780
aaaggaacgg atgcctcttt atttcacgca aatttttgcg gaagtgtcac acaa 834

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pctca2012050236-seq1

<210> 196
 <211> 278
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL778

<400> 196

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Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
 1      5      10      15
Ala Gln Pro Ala Met Ala Ser Ala Gln Ile Gln Lys Ala Glu Gln Asn
 20      25      30
Asp Val Lys Leu Ala Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg
 35      40      45
Leu Val Lys Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val
 50      55      60
Asp Asn Gln Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn Leu
 65      70      75      80
Asp Lys Gly Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser
 85      90      95
Val Arg Gln Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln
100      105      110
Val Arg Thr Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala
115      120      125
Ala Pro Lys Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr
130      135      140
Thr Leu Tyr Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala
145      150      155      160
Phe Ser Val Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu
165      170      175
Leu Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val
180      185      190
Tyr Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile
195      200      205
Ala Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr
210      215      220
Ser Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met
225      230      235      240
Glu Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp
245      250      255
Thr Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe
260      265      270
Cys Gly Ser Val Thr Gln
275

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<210> 197
 <211> 831
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL779

<400> 197

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atggccgccc agattcagaa ggctgaacaa aatgatgtga agctggcacc gccgactgat 120
gtacgaagcg gatataacg tttggtaaa aatgtgaatt attacatcga tagtgaatcg 180
atctgggtgg ataaccaaga gccacaaatt gtacattttg atgcagtggt gaatttagat 240
aagggattgt atgtttatcc tgagcctaaa cgttatgcac gttctgttcg tcagtataag 300
atcttgaatt gtgcaaatta tcatttaact caagtacgaa ctgatttcta tgatgaattt 360
tggggacagg gtttgcgggc agcacctaaa aagcaaaaaga aacatacggt aagttaaaca 420
cctgatacaa cgctttataa tgctgctcag attatttgtg cgaactatgg tgaagcattt 480
tcagttgata aaaaaggcgg cactaaaaaa gcagcggtat ctgaattact gcaagcgtca 540
gcgcccttata aggctgatgt ggaattatgt gtatatagca caaatgaaac aacaaactgt 600
acgggtggaa aaaaatggtat tgcagcagat ataaccacag caaaaaggcta tgtaaaatca 660
gtgacaacaa gcaacggtgc aataacagta aaaggggatg gcacattggc aaatatggaa 720

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pctca2012050236-seq1
tatatatttgc aagctacagg taatgctgca acaggtgtaa cttggacaac aacttgcaaa 780
ggaacggatg cctcttttatt tccagcaaat ttttgcggaa gtgtcacaca a 831

<210> 198
<211> 277
<212> PRT
<213> Artificial Sequence

<220>
<223> LVL779

<400> 198
Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
1 5 10 15
Ala Gln Pro Ala Met Ala Ala Gln Ile Gln Lys Ala Glu Gln Asn Asp
20 25 30
Val Lys Leu Ala Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu
35 40 45
Val Lys Asn Val Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp
50 55 60
Asn Gln Glu Pro Gln Ile Val His Phe Asp Ala Val Val Asn Leu Asp
65 70 75 80
Lys Gly Leu Tyr Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val
85 90 95
Arg Gln Tyr Lys Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val
100 105 110
Arg Thr Asp Phe Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala
115 120 125
Pro Lys Lys Gln Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr
130 135 140
Leu Tyr Asn Ala Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe
145 150 155 160
Ser Val Asp Lys Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu Leu
165 170 175
Leu Gln Ala Ser Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr
180 185 190
Ser Thr Asn Glu Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala
195 200 205
Ala Asp Ile Thr Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser
210 215 220
Asn Gly Ala Ile Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu
225 230 235 240
Tyr Ile Leu Gln Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr
245 250 255
Thr Thr Cys Lys Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys
260 265 270
Gly Ser Val Thr Gln
275

<210> 199
<211> 819
<212> DNA
<213> Artificial Sequence

<220>
<223> LVL780

<400> 199
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tatatacgtt tggtaaagaa tgtgaattat tacatcgata gtgaatcgat ctgggtggat 180
aaccaagagc cacaaattgt acattttgat gcagtgggtg atttagataa gggattgtat 240
gtttatcctg agcctaaacg ttatgcacgt tctgttcgtc agtataagat cttgaattgt 300
gcaaattatc atttaactca agtacgaaat gatttctatg atgaattttg gggacagggt 360
ttgcgggcag cacctaaaaa gcaaaagaaa catacgtaa gttaaacacc tgatacaacg 420
ctttataatg ctgctcagat tatttggtgc aactatgggt aagcattttc agttgataaa 480
aaaggcggca ctaaaaaagc agcgggtatc gaattactgc aagcgtcagc gccttataag 540

pctca2012050236-seq1
gctgatgtgg aattatgtgt atatagcaca aatgaaacaa caaactgtac ggggtggaaaa 600
aatgggtattg cagcagatat aaccacagca aaaggctatg taaaatcagt gacaacaagc 660
aacgggtgcaa taacagtaaa aggggatggc acattggcaa atatggaata tattttgcaa 720
gctacaggta atgctgcaac aggtgtaact tggacaacaa ctgcaaagg aacggatgcc 780
tctttatttc cagcaaattt ttgcggaagt gtcacacaa 819

<210> 200
<211> 273
<212> PRT
<213> Artificial Sequence

<220>
<223> LVL780

<400> 200
Met Lys Tyr Leu Leu Pro Thr Ala Ala Ala Gly Leu Leu Leu Leu Ala
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Ala Gln Pro Ala Met Ala Lys Ala Glu Gln Asn Asp Val Lys Leu Ala
20 25 30
Pro Pro Thr Asp Val Arg Ser Gly Tyr Ile Arg Leu Val Lys Asn Val
35 40 45
Asn Tyr Tyr Ile Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro
50 55 60
Gln Ile Val His Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr
65 70 75 80
Val Tyr Pro Glu Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys
85 90 95
Ile Leu Asn Cys Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe
100 105 110
Tyr Asp Glu Phe Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln
115 120 125
Lys Lys His Thr Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala
130 135 140
Ala Gln Ile Ile Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys
145 150 155 160
Lys Gly Gly Thr Lys Lys Ala Ala Val Ser Glu Leu Leu Gln Ala Ser
165 170 175
Ala Pro Tyr Lys Ala Asp Val Glu Leu Cys Val Tyr Ser Thr Asn Glu
180 185 190
Thr Thr Asn Cys Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp Ile Thr
195 200 205
Thr Ala Lys Gly Tyr Val Lys Ser Val Thr Thr Ser Asn Gly Ala Ile
210 215 220
Thr Val Lys Gly Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile Leu Gln
225 230 235 240
Ala Thr Gly Asn Ala Ala Thr Gly Val Thr Trp Thr Thr Thr Cys Lys
245 250 255
Gly Thr Asp Ala Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser Val Thr
260 265 270
Gln

<210> 201
<211> 816
<212> DNA
<213> Artificial Sequence

<220>
<223> LVL781

<400> 201
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atggccgctg aacaaaatga tgtgaagctg gcaccgccga ctgatgtacg aagcggatat 120
atacgttttg taaagaatgt gaattattac atcgatagtg aatcgatctg ggtggataac 180
caagagccac aaattgtaca ttttgatgca gtggtgaatt tagataaggg attgtatgtt 240
tatcctgagc ctaaacgtta tgcacgttct gttcgtcagt ataagatctt gaattgtgca 300
aattatcatt taactcaagt acgaactgat ttctatgatg aattttgggg acagggtttg 360

pctca2012050236-seq1

cgggcagcac	ctaaaaagca	aaagaaacat	acgttaagtt	taacacctga	tacaacgctt	420
tataatgctg	ctcagattat	ttgtgcgaac	tatgggtgaag	catttttcagt	tgataaaaaa	480
ggcggcacta	aaaaagcagc	ggtatctgaa	ttactgcaag	cgtcagcgcc	ttataaggct	540
gatgtggaat	tatgtgtata	tagcacaat	gaaacaacaa	actgtacggg	tggaaaaaat	600
ggtattgcag	cagatataac	cacagcaaaa	ggctatgtaa	aatcagtgac	aacaagcaac	660
ggtgcaataa	cagtaaaagg	ggatggcaca	ttggcaaata	tggaatatat	tttgcaagct	720
acaggtaatg	ctgcaacagg	tgtaacttgg	acaacaactt	gcaaagggaac	ggatgcctct	780
ttatttccag	caaatttttg	cggaagtgtc	acacaa			816

<210> 202
 <211> 272
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> LVL781

<400> 202

Met	Lys	Tyr	Leu	Leu	Pro	Thr	Ala	Ala	Ala	Gly	Leu	Leu	Leu	Ala	
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Ala	Gln	Pro	Ala	Met	Ala	Ala	Glu	Gln	Asn	Asp	Val	Lys	Leu	Ala	Pro
		20					25					30			
Pro	Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35				40						45			
Tyr	Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55					60				
Ile	Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70				75					80	
Tyr	Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
			85					90					95		
Leu	Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
		100					105						110		
Asp	Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115				120						125			
Lys	His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140				
Gln	Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145					150				155						160
Gly	Gly	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu	Leu	Gln	Ala	Ser	Ala
			165					170						175	
Pro	Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr	Ser	Thr	Asn	Glu	Thr
			180					185					190		
Thr	Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala	Ala	Asp	Ile	Thr	Thr
		195					200					205			
Ala	Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser	Asn	Gly	Ala	Ile	Thr
	210					215					220				
Val	Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu	Tyr	Ile	Leu	Gln	Ala
225					230				235					240	
Thr	Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr	Thr	Thr	Cys	Lys	Gly
			245					250					255		
Thr	Asp	Ala	Ser	Leu	Phe	Pro	Ala	Asn	Phe	Cys	Gly	Ser	Val	Thr	Gln
			260					265					270		

<210> 203
 <211> 813
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> LVL782

<400> 203

atgaaatacc	tgctgccgac	cgctgctgct	ggctgctgct	tcctcgctgc	ccagccggcg	60
atggccgaac	aaaatgatgt	gaagctggca	ccgccgactg	atgtacgaag	cggatatata	120
cgtttggtaa	agaatgtgaa	ttattacatc	gatagtgaat	cgatctgggt	ggataaccaa	180
gagccacaaa	ttgtacattt	tgatgcagtg	gtgaatttag	ataagggatt	gtatgtttat	240
cctgagccta	aacgttatgc	acgttctgtt	cgtcagtata	agatcttgaa	ttgtgcaaat	300

pctca2012050236-seq1

tatcatttaa	ctcaagtacg	aactgatttc	tatgatgaat	tttggggaca	gggtttgcgg	360
gcagcaccta	aaaagcaaaa	gaaacatacg	ttaagttaa	cacctgatac	aacgctttat	420
aatgctgctc	agattatttg	tgcgaactat	ggtgaagcat	tttcagttga	taaaaaaggc	480
ggcactaaaa	aagcagcggg	atctgaatta	ctgcaagcgt	cagcgcctta	taaggctgat	540
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		20						25					30	Pro
Thr	Asp	Val	Arg	Ser	Gly	Tyr	Ile	Arg	Leu	Val	Lys	Asn	Val	Asn
		35					40					45		Tyr
Tyr	Ile	Asp	Ser	Glu	Ser	Ile	Trp	Val	Asp	Asn	Gln	Glu	Pro	Gln
	50					55				60				Ile
Val	His	Phe	Asp	Ala	Val	Val	Asn	Leu	Asp	Lys	Gly	Leu	Tyr	Val
65					70					75				80
Pro	Glu	Pro	Lys	Arg	Tyr	Ala	Arg	Ser	Val	Arg	Gln	Tyr	Lys	Ile
			85					90					95	Leu
Asn	Cys	Ala	Asn	Tyr	His	Leu	Thr	Gln	Val	Arg	Thr	Asp	Phe	Tyr
			100					105					110	Asp
Glu	Phe	Trp	Gly	Gln	Gly	Leu	Arg	Ala	Ala	Pro	Lys	Lys	Gln	Lys
		115					120					125		
His	Thr	Leu	Ser	Leu	Thr	Pro	Asp	Thr	Thr	Leu	Tyr	Asn	Ala	Ala
	130					135					140			Gln
Ile	Ile	Cys	Ala	Asn	Tyr	Gly	Glu	Ala	Phe	Ser	Val	Asp	Lys	Lys
145				150					155					160
Gly	Thr	Lys	Lys	Ala	Ala	Val	Ser	Glu	Leu	Leu	Gln	Ala	Ser	Ala
			165					170					175	Pro
Tyr	Lys	Ala	Asp	Val	Glu	Leu	Cys	Val	Tyr	Ser	Thr	Asn	Glu	Thr
		180					185					190		Thr
Asn	Cys	Thr	Gly	Gly	Lys	Asn	Gly	Ile	Ala	Ala	Asp	Ile	Thr	Ala
		195				200						205		
Lys	Gly	Tyr	Val	Lys	Ser	Val	Thr	Thr	Ser	Asn	Gly	Ala	Ile	Thr
	210					215					220			Val
Lys	Gly	Asp	Gly	Thr	Leu	Ala	Asn	Met	Glu	Tyr	Ile	Leu	Gln	Ala
225					230					235				Thr
Gly	Asn	Ala	Ala	Thr	Gly	Val	Thr	Trp	Thr	Thr	Thr	Cys	Lys	Gly
			245					250					255	Thr
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Asp Ser Glu Ser Ile Trp Val Asp Asn Gln Glu Pro Gln Ile Val His
 35      40      45
Phe Asp Ala Val Val Asn Leu Asp Lys Gly Leu Tyr Val Tyr Pro Glu
 50      55      60
Pro Lys Arg Tyr Ala Arg Ser Val Arg Gln Tyr Lys Ile Leu Asn Cys
 65      70      75      80
Ala Asn Tyr His Leu Thr Gln Val Arg Thr Asp Phe Tyr Asp Glu Phe
 85      90      95
Trp Gly Gln Gly Leu Arg Ala Ala Pro Lys Lys Gln Lys Lys His Thr
100      105      110
Leu Ser Leu Thr Pro Asp Thr Thr Leu Tyr Asn Ala Ala Gln Ile Ile
115      120      125
Cys Ala Asn Tyr Gly Glu Ala Phe Ser Val Asp Lys Lys Gly Gly Thr
130      135      140
Lys Lys Ala Ala Val Ser Glu Leu Leu Gln Ala Ser Ala Pro Tyr Lys
145      150      155      160
Ala Asp Val Glu Leu Cys Val Tyr Ser Thr Asn Glu Thr Thr Asn Cys
165      170      175
Thr Gly Gly Lys Asn Gly Ile Ala Ala Asp Ile Thr Thr Ala Lys Gly
180      185      190
Tyr Val Lys Ser Val Thr Thr Ser Asn Gly Ala Ile Thr Val Lys Gly
195      200      205
Asp Gly Thr Leu Ala Asn Met Glu Tyr Ile Leu Gln Ala Thr Gly Asn
210      215      220
Ala Ala Thr Gly Val Thr Trp Thr Thr Thr Cys Lys Gly Thr Asp Ala
225      230      235      240
Ser Leu Phe Pro Ala Asn Phe Cys Gly Ser Val Thr Gln
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