

SEQUENCE LISTING

<110> Jennewein Biotechnologie GmbH

<120> Production of sialylated saccharides

<130> P 1802 WO

<160> 104

<170> PatentIn version 3.5

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<210> 12

<211> 783

<212> DNA

<213> *Campylobacter jejuni*

<400> 12

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aactataacc aggcgcatct ggaaaacgaa aactttgtga aaaccttcta cgattatfff	300
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<210> 13
 <211> 897
 <212> DNA
 <213> Streptococcus entericus

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<210> 14
 <211> 888
 <212> DNA
 <213> *Haemophilus ducreyi*

<400> 14	
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<210> 15
 <211> 1467
 <212> DNA
 <213> *Alistipes* sp.

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<210> 16

<211> 876

<212> DNA

<213> Campylobacter jejuni

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ccgtctgaca tcaaacatta ttttaaagggt aaataa 876

<210> 17
<211> 939
<212> DNA
<213> Streptococcus agalactiae

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ccggttgaac tgctgccgag taacgtcccg atggaaatta tcgaactgat gctgaccggc	840
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<210> 18
 <211> 1233
 <212> DNA
 <213> Bibersteinia trehalosi

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<210> 19
 <211> 1221
 <212> DNA
 <213> Haemophilus parahaemolyticus

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<210> 20
 <211> 903
 <212> DNA
 <213> Haemophilus somnus

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<210> 21
 <211> 1146
 <212> DNA
 <213> Vibrio harveyi

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 <211> 1452
 <212> DNA
 <213> Alistipes sp.

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<210> 23
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 <212> DNA
 <213> Alistipes shahii

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 <213> Actinobacillus suis

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tcgtaa	1206

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 <212> DNA
 <213> Actinobacillus capsulatus

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 <211> 936
 <212> DNA
 <213> Haemophilus somnus

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 <212> DNA
 <213> Haemophilus ducreyi

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<210> 28

<211> 1494

<212> DNA

<213> Photobacterium leiognathi

<400> 28

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<210> 29
 <211> 1497
 <212> DNA
 <213> Photobacterium sp.

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<210> 30
 <211> 1449
 <212> DNA
 <213> Photobacterium leiognathi

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 <211> 2028
 <212> DNA
 <213> Photobacterium damsela

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<210> 32
 <211> 1533
 <212> DNA
 <213> Photobacterium damsela

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cacgatctgc gtgactacct gggttcatcg gcaaaacaga tgccgtggga tgaatttgct	960
aaactgagtg actcccagca aaccctgttt ctggatatcg ttggcttcga caaagaacag	1020
ctgcaacaac agtattcaca atcgccgctg ccgaatttta tttttaccgg caccaccacc	1080
tgggcggggc gtgaaacgaa agaattattac gcccaacagc aagtgaacgt tattaacaat	1140
gccatcaatg aaaccagccc gtattacctg ggcaaagatt acgacctgtt tttcaaaggt	1200
catccggcag gcggtgtgat caacgatatt atcctgggca gttttccgga catgattaat	1260
atcccggcta aaatttcctt cgaagtgtg atgatgaccg atatgctgcc ggacacggtt	1320
gcaggatatc ctagctctct gtattttacc attccggcgg ataaagtga ctttatcggt	1380
ttcacgagtt ccgatacgat taccgaccgt gaagaagccc tgaaaagccc gctggtccag	1440
gtgatgctga ccctgggcat cgtcaaagaa aaagatgtgc tgttctgggc agacctgccg	1500
gactgctcgt ctggtgtgtg tatcgacaaa taa	1533

<210> 33

<211> 1269

<212> DNA

<213> *Hellobacter acinonychis*

<400> 33

atggggacca ttaaaaagcc cttaatcata gcaggaaatg gtccatcaat taaggaccta	60
gactatgctt tatttccaaa agacttcgat gtctttcgct gcaaccagtt ttacttcgag	120
gataaatatt acctaggacg cgaaataaaa ggagtgttct ttaacccttg tgtattaagc	180
agtcaaatgc aaacagtgca ataccttatg gacaatggcg aatatagcat agaacgcttc	240
ttttgcagtg tttcaacaga tcgccacgat tttgatgggg attaccaaac gattttaccg	300
gtagacgggt atttaaaagc acactatccg ttcgtctgcg atacattcag cttattcaaa	360
ggtcacgaag aaatcttaaa acacgtgaaa taccacctga aaacgtacag caaagaactt	420
agtgcgggtg tcttaatggt attgagtgc gtggtattag gatacaaaga aatataccta	480
gtaggaatcg acttcggcgc ctcatcttgg gggcacttct atgacgaaag ccaatcccaa	540
cacttttagca atcacatggc agattgtcac aatatctatt acgacatgct gactatttgt	600
ctctgtcaaa agtatgcaaa attgtacgca ttagcaccca attcaccatt atcacatttg	660
cttacactaa atccacaggc caaatacca tttgaactat tagataaacc tatcgggtat	720
actagcgacc taattattag tagcccgttg gaagagaagt tgctcgaatt taagaatatc	780
gaagagaagt tgcttgagtt caaaaacata gaagagaaac tcttagagtt caagaatatt	840
gaagagaaac tattagaatt taaaaacatc gaggaaaaac ttttgagtt caaaaatata	900
gaagagaaac tcctagagtt caagaacatt gaggaaaagt tgcttgagtt caaaaatatt	960
gaggaaaagt tgctcgaatt taagaatatc gaggaaaaac ttttggaatt taagaacata	1020
gaagaaaagt tactcgaatt taaaaacatt gaagagaaac tattggaatt taaaaatata	1080
gaggaaaagt tacttgagtt caaaaacata gaggaaaagt tacttgaatt taagaacata	1140
gaagagaaac ttctcgcaag ccgactgaac aacattctac gtaaaatcaa gcggaaaata	1200
cttccattct tttggggcgg aggtgtaacc ccaacattaa aagttagttt ccgttgggga	1260
gctgcataa	1269

<210> 34
 <211> 469
 <212> PRT
 <213> Campylobacter coli

<400> 34

Met	Gln	Asn	Val	Ile	Ile	Ala	Gly	Asn	Gly	Pro	Ser	Leu	Gln	Ser	Ile
1				5				10					15		

Asn Tyr Gln Arg Leu Pro Lys Glu Tyr Asp Ile Phe Arg Cys Asn Gln
20 25 30

Phe Tyr Phe Glu Asp Lys Tyr Tyr Leu Gly Lys Asn Ile Lys Ala Ala
35 40 45

Phe Phe Asn Pro Tyr Pro Phe Leu Gln Gln Tyr His Thr Ala Lys Gln
50 55 60

Leu Val Phe Asn Asn Glu Tyr Lys Ile Glu Asn Ile Phe Cys Ser Thr
65 70 75 80

Phe Asn Leu Pro Phe Ile Glu Lys Asp Asn Phe Ile Asn Lys Phe Tyr
85 90 95

Asp Phe Phe Pro Asp Ala Lys Leu Gly His Lys Ile Ile Glu Asn Leu
100 105 110

Lys Glu Phe Tyr Ala Tyr Ile Lys Tyr Asn Glu Ile Tyr Leu Asn Lys
115 120 125

Arg Ile Thr Ser Gly Ile Tyr Met Cys Ala Ile Ala Ile Ala Leu Gly
130 135 140

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

Ile Tyr Pro Phe Lys Ala Met Ser Lys Asn Ile Lys Lys Ile Phe Pro
165 170 175

Trp Ile Lys Asp Phe Asn Pro Ser Asn Phe His Ser Lys Glu Tyr Asp
180 185 190

Ile Glu Ile Leu Lys Leu Leu Glu Ser Ile Tyr Lys Val Asn Ile Tyr
195 200 205

Ala Leu Cys Asp Asn Ser Ala Leu Ala Asn Tyr Phe Pro Leu Leu Val
210 215 220

Asn Thr Asp Asn Ser Phe Val Leu Glu Asn Lys Ser Asp Asp Cys Ile
225 230 235 240

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

Ser Gln Ile Gln Val Asn Asn Thr Glu Ile Leu Leu Leu Asn Phe Gln
260 265 270

Asn Met Ile Ser Ala Lys Glu Asn Glu Ile Ser Asn Leu Asn Lys Ile
275 280 285

Leu Gln Asp Ser Tyr Lys Thr Ile Asn Thr Lys Glu Asn Glu Ile Ser
290 295 300

Asn Leu Asn Lys Ile Leu Gln Asp Ser Tyr Lys Thr Ile Asn Thr Lys
305 310 315 320

Glu Asn Glu Ile Ser Asn Leu Asn Lys Ile Leu Gln Asp Lys Asp Lys
325 330 335

Leu Leu Ile Val Lys Glu Asn Leu Leu Asn Phe Lys Ser Arg His Gly
340 345 350

Lys Ala Lys Phe Arg Ile Gln Asn Gln Leu Ser Tyr Lys Leu Gly Gln
355 360 365

Ala Met Met Val Asn Ser Lys Ser Leu Leu Gly Tyr Ile Arg Met Pro
370 375 380

Phe Val Leu Ser Tyr Ile Lys Asp Lys His Lys Gln Glu Gln Lys Ile
385 390 395 400

Tyr Gln Glu Lys Ile Lys Lys Asp Pro Ser Leu Thr Leu Pro Pro Leu
405 410 415

Glu Asp Tyr Pro Asp Tyr Lys Glu Ala Leu Lys Glu Lys Glu Cys Leu
420 425 430

Thr Tyr Arg Leu Gly Gln Thr Leu Ile Lys Ala Asp Gln Glu Trp Tyr
435 440 445

Lys Gly Gly Tyr Val Lys Met Trp Phe Glu Ile Lys Lys Leu Lys Lys
450 455 460

Glu Tyr Lys Lys Lys
465

<210> 35
<211> 381
<212> PRT
<213> Vibrio sp.

<400> 35

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

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

Val Ser Gln Lys Thr Ser Asn Lys Lys Leu Ile Ser Trp Ser Arg Tyr
35 40 45

Pro Ile Thr Asp Lys Ser Leu Leu Lys Lys Ile Asn Ala Glu Phe Phe
50 55 60

Lys Glu Gln Phe Glu Leu Thr Glu Ser Leu Lys Asn Ile Ile Leu Ser
65 70 75 80

Glu Asn Ile Asp Asn Leu Ile Ile His Gly Asn Thr Leu Trp Ser Ile
85 90 95

Asp Val Val Asp Ile Ile Lys Glu Val Asn Leu Leu Gly Lys Asn Ile
100 105 110

Pro Ile Glu Leu His Phe Tyr Asp Asp Gly Ser Ala Glu Tyr Val Arg
115 120 125

Ile Tyr Glu Phe Ser Lys Leu Pro Glu Ser Glu Gln Lys Tyr Lys Thr
130 135 140

Ser Leu Ser Lys Asn Asn Ile Lys Phe Ser Ile Asp Gly Thr Asp Ser

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

Leu Ile Asn Arg Asp Asn Ile Lys Leu Ile Ser Asp Ile
370 375 380

<210> 36
<211> 390
<212> PRT
<213> Photobacterium sp.

<400> 36

Met Gly Cys Asn Ser Asp Ser Asn His Asn Asn Ser Asp Gly Asn Ile
1 5 10 15

Thr Lys Asn Lys Thr Ile Glu Val Tyr Val Asp Arg Ala Thr Leu Pro
20 25 30

Thr Ile Gln Gln Met Thr Gln Ile Ile Asn Glu Asn Ser Asn Asn Lys
35 40 45

Lys Leu Ile Ser Trp Ser Arg Tyr Pro Ile Asn Asp Glu Glu Leu Leu
50 55 60

Glu Ser Ile Asn Gly Ser Phe Phe Lys Asn Asn Ser Glu Leu Ile Lys
65 70 75 80

Ser Leu Asp Ser Met Ile Leu Thr Asn Asp Ile Lys Lys Val Ile Ile
85 90 95

Asn Gly Asn Thr Leu Trp Ala Ala Asp Val Val Asn Ile Ile Lys Ser
100 105 110

Ile Glu Ala Phe Gly Lys Lys Thr Glu Ile Glu Leu Asn Phe Tyr Asp
115 120 125

Asp Gly Ser Ala Glu Tyr Val Arg Leu Tyr Asp Phe Ser Lys Leu Pro
130 135 140

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

Ser Ser Ile Asn Gly Thr Gln Pro Phe Glu Asn Val Val Glu Asn Ile
165 170 175

Tyr Gly Phe Ser Gln Leu Tyr Pro Thr Thr Tyr His Met Leu Arg Ala
180 185 190

Asp Ile Phe Glu Thr Asn Leu Pro Leu Arg Ser Leu Lys Gly Val Leu
195 200 205

Ser Asn Asn Ile Lys Gln Met Lys Trp Asp Tyr Phe Lys Thr Phe Asn
210 215 220

Ser Gln Gln Lys Asp Lys Phe Tyr Asn Phe Thr Gly Phe Asn Pro Asp
225 230 235 240

Glu Ile Met Glu Gln Tyr Lys Ala Ser Pro Asn Lys Asn Phe Ile Phe
245 250 255

Val Gly Thr Asn Ser Gly Thr Ala Thr Ala Glu Gln Gln Ile Asp Ile
260 265 270

Leu Thr Glu Ala Lys Asn Pro Asn Ser Pro Ile Ile Thr Lys Ser Ile
275 280 285

Gln Gly Phe Asp Leu Phe Phe Lys Gly His Pro Ser Ala Thr Tyr Asn
290 295 300

Lys Gln Ile Ile Asp Ala His Asn Met Ile Glu Ile Tyr Asn Lys Ile
305 310 315 320

Pro Phe Glu Ala Leu Ile Met Thr Asp Ala Leu Pro Asp Ala Val Gly
325 330 335

Gly Met Gly Ser Ser Val Phe Phe Ser Leu Pro Asn Thr Val Glu Asn
340 345 350

Lys Phe Ile Phe Tyr Lys Ser Asp Thr Asp Ile Glu Asn Asn Ala Leu
355 360 365

Ile Gln Val Met Ile Glu Leu Asn Ile Val Asn Arg Asn Asp Val Lys
370 375 380

Leu Ile Ser Asp Leu Gln
385 390

<210> 37
<211> 388
<212> PRT
<213> Pasteurella multocida

<400> 37

Met Lys Thr Ile Thr Leu Tyr Leu Asp Pro Ala Ser Leu Pro Ala Leu
1 5 10 15

Asn Gln Leu Met Asp Phe Thr Gln Asn Asn Glu Asp Lys Thr His Pro
20 25 30

Arg Ile Phe Gly Leu Ser Arg Phe Lys Ile Pro Asp Asn Ile Ile Thr
35 40 45

Gln Tyr Gln Asn Ile His Phe Val Glu Leu Lys Asp Asn Arg Pro Thr
50 55 60

Glu Ala Leu Phe Thr Ile Leu Asp Gln Tyr Pro Gly Asn Ile Glu Leu
65 70 75 80

Asp Ile His Leu Asn Ile Ala His Ser Val Gln Leu Ile Arg Pro Ile
85 90 95

Leu Ala Tyr Arg Phe Lys His Leu Asp Arg Val Ser Ile Gln Arg Leu
100 105 110

Asn Leu Tyr Asp Asp Gly Ser Met Glu Tyr Val Asp Leu Glu Lys Glu
115 120 125

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

Ser His Tyr Leu Leu Thr Gly Lys Ile Lys Phe Asp Asn Pro Thr Ile
145 150 155 160

Ala Arg Tyr Val Trp Gln Ser Ala Phe Pro Val Lys Tyr His Phe Leu
165 170 175

Ser Thr Asp Tyr Phe Glu Lys Ala Glu Phe Leu Gln Pro Leu Lys Glu
180 185 190

Tyr Leu Ala Glu Asn Tyr Gln Lys Met Asp Trp Thr Ala Tyr Gln Gln
195 200 205

Leu Thr Pro Glu Gln Gln Ala Phe Tyr Leu Thr Leu Val Gly Phe Asn
210 215 220

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

Thr Gly Thr Thr Thr Trp Glu Gly Asn Thr Asp Val Arg Glu Tyr Tyr
245 250 255

Ala Gln Gln Gln Leu Asn Leu Leu Asn His Phe Thr Gln Ala Gly Gly
260 265 270

Asp Leu Phe Ile Gly Asp His Tyr Lys Ile Tyr Phe Lys Gly His Pro
275 280 285

Arg Gly Gly Glu Ile Asn Asp Tyr Ile Leu Asn Asn Ala Lys Asn Ile
290 295 300

Thr Asn Ile Pro Ala Asn Ile Ser Phe Glu Val Leu Met Met Thr Gly
305 310 315 320

Leu Leu Pro Asp Lys Val Gly Gly Val Ala Ser Ser Leu Tyr Phe Ser
325 330 335

Leu Pro Lys Glu Lys Ile Ser His Ile Ile Phe Thr Ser Asn Lys Gln
340 345 350

Val Lys Ser Lys Glu Asp Ala Leu Asn Asn Pro Tyr Val Lys Val Met
355 360 365

Arg Arg Leu Gly Ile Ile Asp Glu Ser Gln Val Ile Phe Trp Asp Ser
370 375 380

Leu Lys Gln Leu

385

<210> 38

<211> 371

<212> PRT

<213> Neisseria meningitidis

<400> 38

Met Gly Leu Lys Lys Ala Cys Leu Thr Val Leu Cys Leu Ile Val Phe
1 5 10 15

Cys Phe Gly Ile Phe Tyr Thr Phe Asp Arg Val Asn Gln Gly Glu Arg
20 25 30

Asn Ala Val Ser Leu Leu Lys Glu Lys Leu Phe Asn Glu Glu Gly Glu
35 40 45

Pro Val Asn Leu Ile Phe Cys Tyr Thr Ile Leu Gln Met Lys Val Ala
50 55 60

Glu Arg Ile Met Ala Gln His Pro Gly Glu Arg Phe Tyr Val Val Leu
65 70 75 80

Met Ser Glu Asn Arg Asn Glu Lys Tyr Asp Tyr Tyr Phe Asn Gln Ile
85 90 95

Lys Asp Lys Ala Glu Arg Ala Tyr Phe Phe His Leu Pro Tyr Gly Leu
100 105 110

Asn Lys Ser Phe Asn Phe Ile Pro Thr Met Ala Glu Leu Lys Val Lys
115 120 125

Ser Met Leu Leu Pro Lys Val Lys Arg Ile Tyr Leu Ala Ser Leu Glu
130 135 140

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

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

Leu Gly Asp Glu Phe Ser Val Asn Gly Thr Ile Lys Arg Asn Phe Ala
180 185 190

Arg Met Met Ile Gly Asp Trp Ser Ile Ala Lys Thr Arg Asn Ala Ser
195 200 205

Asp Glu His Tyr Thr Ile Phe Lys Gly Leu Lys Asn Ile Met Asp Asp
210 215 220

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

Lys Thr Gly Asp Glu Thr Gly Gly Thr Val Arg Ile Leu Leu Gly Ser
245 250 255

Pro Asp Lys Glu Met Lys Glu Ile Ser Glu Lys Ala Ala Lys Asn Phe
260 265 270

Lys Ile Gln Tyr Val Ala Pro His Pro Arg Gln Thr Tyr Gly Leu Ser
275 280 285

Gly Val Thr Thr Leu Asn Ser Pro Tyr Val Ile Glu Asp Tyr Ile Leu
290 295 300

Arg Glu Ile Lys Lys Asn Pro His Thr Arg Tyr Glu Ile Tyr Thr Phe
305 310 315 320

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

Tyr Ala Leu Lys Pro Ala Ser Leu Pro Glu Asp Tyr Trp Leu Lys Pro
340 345 350

Val Tyr Ala Leu Phe Thr Gln Ser Gly Ile Pro Ile Leu Thr Phe Asp
355 360 365

Asp Lys Asn
370

<210> 39

<211> 283

<212> PRT

<213> Pasteurella multocida

<400> 39

Met Asp Lys Phe Ala Glu His Glu Ile Pro Lys Ala Val Ile Val Ala
1 5 10 15

Gly Asn Gly Glu Ser Leu Ser Gln Ile Asp Tyr Arg Leu Leu Pro Lys
20 25 30

Asn Tyr Asp Val Phe Arg Cys Asn Gln Phe Tyr Phe Glu Glu Arg Tyr
35 40 45

Phe Leu Gly Asn Lys Ile Lys Ala Val Phe Phe Thr Pro Gly Val Phe
50 55 60

Leu Glu Gln Tyr Tyr Thr Leu Tyr His Leu Lys Arg Asn Asn Glu Tyr
65 70 75 80

Phe Val Asp Asn Val Ile Leu Ser Ser Phe Asn His Pro Thr Val Asp
85 90 95

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

Gly Tyr Glu Lys Tyr Leu Ser Lys Leu Thr Ala Phe Asp Val Tyr Leu
115 120 125

Arg Tyr Lys Glu Leu Tyr Glu Asn Gln Arg Ile Thr Ser Gly Val Tyr
130 135 140

Met Cys Ala Val Ala Ile Ala Met Gly Tyr Thr Asp Ile Tyr Leu Thr
145 150 155 160

Gly Ile Asp Phe Tyr Gln Ala Ser Glu Glu Asn Tyr Ala Phe Asp Asn
165 170 175

Lys Lys Pro Asn Ile Ile Arg Leu Leu Pro Asp Phe Arg Lys Glu Lys
180 185 190

Thr Leu Phe Ser Tyr His Ser Lys Asp Ile Asp Leu Glu Ala Leu Ser

195

200

205

Phe Leu Gln Gln His Tyr His Val Asn Phe Tyr Ser Ile Ser Pro Met
 210 215 220

Ser Pro Leu Ser Lys His Phe Pro Ile Pro Thr Val Glu Asp Asp Cys
 225 230 235 240

Glu Thr Thr Phe Val Ala Pro Leu Lys Glu Asn Tyr Ile Asn Asp Ile
 245 250 255

Leu Leu Pro Pro His Phe Val Tyr Glu Lys Leu Gly Val Asp Lys Leu
 260 265 270

Ala Ala Ala Leu Glu His His His His His His
 275 280

<210> 40

<211> 385

<212> PRT

<213> Pasteurella dagmatis

<400> 40

Met Thr Ile Tyr Leu Asp Pro Ala Ser Leu Pro Thr Leu Asn Gln Leu
 1 5 10 15

Met His Phe Thr Lys Glu Ser Glu Asp Lys Glu Thr Ala Arg Ile Phe
 20 25 30

Gly Phe Ser Arg Phe Lys Leu Pro Glu Lys Ile Thr Glu Gln Tyr Asn
 35 40 45

Asn Ile His Phe Val Glu Ile Lys Asn Asn Arg Pro Thr Glu Asp Ile
 50 55 60

Phe Thr Ile Leu Asp Gln Tyr Pro Glu Lys Leu Glu Leu Asp Leu His
 65 70 75 80

Leu Asn Ile Ala His Ser Ile Gln Leu Phe His Pro Ile Leu Gln Tyr
 85 90 95

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

Asp Asp Gly Thr Met Glu Tyr Val Asp Leu Glu Lys Glu Glu Asn Lys
115 120 125

Asp Ile Lys Ser Ala Ile Lys Lys Ala Glu Lys Gln Leu Ser Asp Tyr
130 135 140

Leu Leu Thr Gly Lys Ile Asn Phe Asp Asn Pro Thr Leu Ala Arg Tyr
145 150 155 160

Val Trp Gln Ser Gln Tyr Pro Val Lys Tyr His Phe Leu Ser Thr Glu
165 170 175

Tyr Phe Glu Lys Ala Glu Phe Leu Gln Pro Leu Lys Thr Tyr Leu Ala
180 185 190

Gly Lys Tyr Gln Lys Met Asp Trp Ser Ala Tyr Glu Lys Leu Ser Pro
195 200 205

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

Lys Gln Leu Phe His Thr Glu Gln Thr Lys Phe Ile Phe Thr Gly Thr
225 230 235 240

Thr Thr Trp Glu Gly Asn Thr Asp Ile Arg Glu Tyr Tyr Ala Lys Gln
245 250 255

Gln Leu Asn Leu Leu Lys His Phe Thr His Ser Glu Gly Asp Leu Phe
260 265 270

Ile Gly Asp Gln Tyr Lys Ile Tyr Phe Lys Gly His Pro Arg Gly Gly
275 280 285

Asp Ile Asn Asp Tyr Ile Leu Lys His Ala Lys Asp Ile Thr Asn Ile
290 295 300

Pro Ala Asn Ile Ser Phe Glu Ile Leu Met Met Thr Gly Leu Leu Pro
305 310 315 320

Asp Lys Val Gly Gly Val Ala Ser Ser Leu Tyr Phe Ser Leu Pro Lys
325 330 335

Glu Lys Ile Ser His Ile Ile Phe Thr Ser Asn Lys Lys Ile Lys Asn
340 345 350

Lys Glu Asp Ala Leu Asn Asp Pro Tyr Val Arg Val Met Leu Arg Leu
355 360 365

Gly Met Ile Asp Lys Ser Gln Ile Ile Phe Trp Asp Ser Leu Lys Gln
370 375 380

Leu
385

<210> 41
<211> 390
<212> PRT
<213> Photobacterium phosphoreum

<400> 41

Met Gly Cys Asn Ser Asp Ser Lys His Asn Asn Ser Asp Gly Asn Ile
1 5 10 15

Thr Lys Asn Lys Thr Ile Glu Val Tyr Val Asp Arg Ala Thr Leu Pro
20 25 30

Thr Ile Gln Gln Met Thr Gln Ile Ile Asn Glu Asn Ser Asn Asn Lys
35 40 45

Lys Leu Ile Ser Trp Ser Arg Tyr Pro Ile Asn Asp Glu Thr Leu Leu
50 55 60

Glu Ser Ile Asn Gly Ser Phe Phe Lys Asn Arg Pro Glu Leu Ile Lys
65 70 75 80

Ser Leu Asp Ser Met Ile Leu Thr Asn Glu Ile Lys Lys Val Ile Ile
85 90 95

Asn Gly Asn Thr Leu Trp Ala Val Asp Val Val Asn Ile Ile Lys Ser

100

105

110

Ile Glu Ala Leu Gly Lys Lys Thr Glu Ile Glu Leu Asn Phe Tyr Asp
 115 120 125

Asp Gly Ser Ala Glu Tyr Val Arg Leu Tyr Asp Phe Ser Arg Leu Pro
 130 135 140

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

Ser Ser Ile Asn Gly Thr Gln Pro Phe Asp Asn Ser Ile Glu Asn Ile
 165 170 175

Tyr Gly Phe Ser Gln Leu Tyr Pro Thr Thr Tyr His Met Leu Arg Ala
 180 185 190

Asp Ile Phe Glu Thr Asn Leu Pro Leu Thr Ser Leu Lys Arg Val Ile
 195 200 205

Ser Asn Asn Ile Lys Gln Met Lys Trp Asp Tyr Phe Thr Thr Phe Asn
 210 215 220

Ser Gln Gln Lys Asn Lys Phe Tyr Asn Phe Thr Gly Phe Asn Pro Glu
 225 230 235 240

Lys Ile Lys Glu Gln Tyr Lys Ala Ser Pro His Glu Asn Phe Ile Phe
 245 250 255

Ile Gly Thr Asn Ser Gly Thr Ala Thr Ala Glu Gln Gln Ile Asp Ile
 260 265 270

Leu Thr Glu Ala Lys Lys Pro Asp Ser Pro Ile Ile Thr Asn Ser Ile
 275 280 285

Gln Gly Leu Asp Leu Phe Phe Lys Gly His Pro Ser Ala Thr Tyr Asn
 290 295 300

Gln Gln Ile Ile Asp Ala His Asn Met Ile Glu Ile Tyr Asn Lys Ile
 305 310 315 320

Pro Phe Glu Ala Leu Ile Met Thr Asp Ala Leu Pro Asp Ala Val Gly
325 330 335

Gly Met Gly Ser Ser Val Phe Phe Ser Leu Pro Asn Thr Val Glu Asn
340 345 350

Lys Phe Ile Phe Tyr Lys Ser Asp Thr Asp Ile Glu Asn Asn Ala Leu
355 360 365

Ile Gln Val Met Ile Glu Leu Asn Ile Val Asn Arg Asn Asp Val Lys
370 375 380

Leu Ile Ser Asp Leu Gln
385 390

<210> 42
<211> 417
<212> PRT
<213> Avibacterium paragallinarum

<400> 42

Met Arg Lys Ile Ile Thr Phe Phe Ser Leu Phe Phe Ser Ile Ser Ala
1 5 10 15

Trp Cys Gln Lys Met Glu Ile Tyr Leu Asp Tyr Ala Ser Leu Pro Ser
20 25 30

Leu Asn Met Ile Leu Asn Leu Val Glu Asn Lys Asn Asn Glu Lys Val
35 40 45

Glu Arg Ile Ile Gly Phe Glu Arg Phe Asp Phe Asn Lys Glu Ile Leu
50 55 60

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

Asp Ile Lys Glu Phe Ser Asp Lys Leu Tyr Leu Asn Ile Glu Lys Ser
85 90 95

Asp Thr Pro Val Asp Leu Ile Ile His Thr Asn Leu Asp His Ser Val
100 105 110

Arg Ser Leu Leu Ser Ile Phe Lys Thr Leu Ser Pro Leu Phe His Lys
115 120 125

Ile Asn Ile Glu Lys Leu Tyr Leu Tyr Asp Asp Gly Ser Gly Asn Tyr
130 135 140

Val Asp Leu Tyr Gln His Arg Gln Glu Asn Ile Ser Ala Ile Leu Ile
145 150 155 160

Glu Ala Gln Lys Lys Leu Lys Asp Ala Leu Glu Asn Arg Glu Thr Asp
165 170 175

Thr Asp Lys Leu His Ser Leu Thr Arg Tyr Thr Trp His Lys Ile Phe
180 185 190

Pro Thr Glu Tyr Ile Leu Leu Arg Pro Asp Tyr Leu Asp Ile Asp Glu
195 200 205

Lys Met Gln Pro Leu Lys His Phe Leu Ser Asp Thr Ile Val Ser Met
210 215 220

Asp Leu Ser Arg Phe Ser His Phe Ser Lys Asn Gln Lys Glu Leu Phe
225 230 235 240

Leu Lys Ile Thr His Phe Asp Gln Asn Ile Phe Asn Glu Leu Asn Ile
245 250 255

Gly Thr Lys Asn Lys Glu Tyr Lys Thr Phe Ile Phe Thr Gly Thr Thr
260 265 270

Thr Trp Glu Lys Asp Lys Lys Lys Arg Leu Asn Asn Ala Lys Leu Gln
275 280 285

Thr Glu Ile Leu Glu Ser Phe Ile Lys Pro Asn Gly Lys Phe Tyr Leu
290 295 300

Gly Asn Asp Ile Lys Ile Phe Phe Lys Gly His Pro Lys Gly Asp Asp
305 310 315 320

Ile Asn Asp Tyr Ile Ile Arg Lys Thr Gly Ala Glu Lys Ile Pro Ala
325 330 335

Asn Ile Pro Phe Glu Val Leu Met Met Thr Asn Ser Leu Pro Asp Tyr
340 345 350

Val Gly Gly Ile Met Ser Thr Val Tyr Phe Ser Leu Pro Pro Lys Asn
355 360 365

Ile Asp Lys Val Val Phe Leu Gly Ser Glu Lys Ile Lys Asn Glu Asn
370 375 380

Asp Ala Lys Ser Gln Thr Leu Ser Lys Leu Met Leu Met Leu Asn Val
385 390 395 400

Ile Thr Pro Glu Gln Ile Phe Phe Glu Glu Met Pro Asn Pro Ile Asn
405 410 415

Phe

<210> 43
<211> 430
<212> PRT
<213> Campylobacter jejuni

<400> 43

Met Thr Arg Thr Arg Met Glu Asn Glu Leu Ile Val Ser Lys Asn Met
1 5 10 15

Gln Asn Ile Ile Ile Ala Gly Asn Gly Pro Ser Leu Lys Asn Ile Asn
20 25 30

Tyr Lys Arg Leu Pro Arg Glu Tyr Asp Val Phe Arg Cys Asn Gln Phe
35 40 45

Tyr Phe Glu Asp Lys Tyr Tyr Leu Gly Lys Lys Ile Lys Ala Val Phe
50 55 60

Phe Asn Pro Gly Val Phe Leu Gln Gln Tyr His Thr Ala Lys Gln Leu
65 70 75 80

Ile Leu Lys Asn Glu Tyr Glu Ile Lys Asn Ile Phe Cys Ser Thr Phe
85 90 95

Asn Leu Pro Phe Ile Glu Ser Asn Asp Phe Leu His Gln Phe Tyr Asn
100 105 110

Phe Phe Pro Asp Ala Lys Leu Gly Tyr Glu Val Ile Glu Asn Leu Lys
115 120 125

Glu Phe Tyr Ala Tyr Ile Lys Tyr Asn Glu Ile Tyr Phe Asn Lys Arg
130 135 140

Ile Thr Ser Gly Val Tyr Met Cys Ala Ile Ala Ile Ala Leu Gly Tyr
145 150 155 160

Lys Thr Ile Tyr Leu Cys Gly Ile Asp Phe Tyr Glu Gly Asp Val Ile
165 170 175

Tyr Pro Phe Glu Ala Met Ser Thr Asn Ile Lys Thr Ile Phe Pro Gly
180 185 190

Ile Lys Asp Phe Lys Pro Ser Asn Cys His Ser Lys Glu Tyr Asp Ile
195 200 205

Glu Ala Leu Lys Leu Leu Lys Ser Ile Tyr Lys Val Asn Ile Tyr Ala
210 215 220

Leu Cys Asp Asp Ser Ile Leu Ala Asn His Phe Pro Leu Ser Ile Asn
225 230 235 240

Ile Asn Asn Asn Phe Thr Leu Glu Asn Lys His Asn Asn Ser Ile Asn
245 250 255

Asp Ile Leu Leu Thr Asp Asn Thr Pro Gly Val Ser Phe Tyr Lys Asn
260 265 270

Gln Leu Lys Ala Asp Asn Lys Ile Met Leu Asn Phe Tyr Asn Ile Leu
275 280 285

His Ser Lys Asp Asn Leu Ile Lys Phe Leu Asn Lys Glu Ile Ala Val

290

295

300

Leu Lys Lys Gln Thr Thr Gln Arg Ala Lys Ala Arg Ile Gln Asn His
 305 310 315 320

Leu Ser Tyr Lys Leu Gly Gln Ala Leu Ile Ile Asn Ser Lys Ser Val
 325 330 335

Leu Gly Phe Leu Ser Leu Pro Phe Ile Ile Leu Ser Ile Val Ile Ser
 340 345 350

His Lys Gln Glu Gln Lys Ala Tyr Lys Phe Lys Val Lys Lys Asn Pro
 355 360 365

Asn Leu Ala Leu Pro Pro Leu Glu Thr Tyr Pro Asp Tyr Asn Glu Ala
 370 375 380

Leu Lys Glu Lys Glu Cys Phe Thr Tyr Lys Leu Gly Glu Glu Phe Ile
 385 390 395 400

Lys Ala Gly Lys Asn Trp Tyr Gly Glu Gly Tyr Ile Lys Phe Ile Phe
 405 410 415

Lys Asp Val Pro Arg Leu Lys Arg Glu Phe Glu Lys Gly Glu
 420 425 430

<210> 44

<211> 395

<212> PRT

<213> Heliobacter acinonychis

<400> 44

Met Asn Lys Lys Pro Leu Ile Ile Ala Gly Asn Gly Pro Ser Ile Lys
 1 5 10 15

Asp Leu Asp Tyr Ala Leu Phe Pro Lys Asp Phe Asp Val Phe Arg Cys
 20 25 30

Asn Gln Phe Tyr Phe Glu Asp Lys Tyr Tyr Leu Gly Arg Glu Ile Lys
 35 40 45

Gly Val Phe Phe Asn Ala His Val Phe Asp Leu Gln Met Lys Ile Thr
50 55 60

Lys Ala Ile Val Lys Asn Gly Glu Tyr His Pro Asp His Ile Tyr Cys
65 70 75 80

Thr His Val Glu Pro Tyr Gly Tyr Val Asn Gly Asn Gln Gln Leu Met
85 90 95

Gln Glu Tyr Leu Glu Lys His Phe Val Gly Val Arg Ser Thr Tyr Ala
100 105 110

Tyr Leu Lys Asp Leu Glu Pro Phe Phe Ile Leu His Ser Lys Tyr Arg
115 120 125

Asn Phe Tyr Asp Gln His Phe Thr Thr Gly Ile Met Met Leu Leu Val
130 135 140

Ala Ile Gln Leu Gly Tyr Lys Glu Ile Tyr Leu Cys Gly Ile Asp Phe
145 150 155 160

Tyr Glu Asn Gly Phe Gly His Phe Tyr Glu Asn Gln Gly Gly Phe Phe
165 170 175

Glu Glu Asp Ser Asp Pro Met His Asp Lys Asn Ile Asp Ile Gln Ala
180 185 190

Leu Glu Leu Ala Lys Lys Tyr Ala Lys Ile Tyr Ala Leu Val Pro Asn
195 200 205

Ser Ala Leu Val Lys Met Ile Pro Leu Ser Ser Gln Lys Gly Val Leu
210 215 220

Glu Lys Val Lys Asp Arg Ile Gly Leu Gly Glu Phe Lys Arg Glu Lys
225 230 235 240

Phe Gly Gln Lys Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg Gln Lys
245 250 255

Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg
260 265 270

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

Glu Arg Gln Lys Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg Gln Lys
290 295 300

Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg
305 310 315 320

Gln Lys Glu Leu Glu Arg Gln Lys Glu Leu Glu Arg Gln Lys Glu Leu
325 330 335

Glu Leu Glu Arg Ser Leu Lys Ala Arg Leu Lys Ala Val Leu Ala Ser
340 345 350

Lys Gly Ile Arg Gly Asp Asn Leu Ile Ile Val Ser Leu Lys Asp Thr
355 360 365

Tyr Arg Leu Phe Lys Gly Gly Phe Ala Leu Leu Leu Asp Leu Lys Ala
370 375 380

Leu Lys Ser Ile Ile Lys Ala Phe Leu Lys Arg
385 390 395

<210> 45
<211> 260
<212> PRT
<213> Campylobacter jejuni

<400> 45

Met Gly Lys Lys Val Ile Ile Ala Gly Asn Gly Pro Ser Leu Lys Glu
1 5 10 15

Ile Asp Tyr Ser Arg Leu Pro Asn Asp Phe Asp Val Phe Arg Cys Asn
20 25 30

Gln Phe Tyr Phe Glu Asp Lys Tyr Tyr Leu Gly Lys Lys Cys Lys Ala
35 40 45

Val Phe Tyr Asn Pro Ile Leu Phe Phe Glu Gln Tyr Tyr Thr Leu Lys

50

55

60

His Leu Ile Gln Asn Gln Glu Tyr Glu Thr Glu Leu Ile Met Cys Ser
 65 70 75 80

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

Tyr Asp Tyr Phe Pro Asp Ala His Leu Gly Tyr Asp Phe Phe Lys Gln
 100 105 110

Leu Lys Asp Phe Asn Ala Tyr Phe Lys Phe His Glu Ile Tyr Phe Asn
 115 120 125

Gln Arg Ile Thr Ser Gly Val Tyr Met Cys Ala Val Ala Ile Ala Leu
 130 135 140

Gly Tyr Lys Glu Ile Tyr Leu Ser Gly Ile Asp Phe Tyr Gln Asn Gly
 145 150 155 160

Ser Ser Tyr Ala Phe Asp Thr Lys Gln Lys Asn Leu Leu Lys Leu Ala
 165 170 175

Pro Asn Phe Lys Asn Asp Asn Ser His Tyr Ile Gly His Ser Lys Asn
 180 185 190

Thr Asp Ile Lys Ala Leu Glu Phe Leu Glu Lys Thr Tyr Lys Ile Lys
 195 200 205

Leu Tyr Cys Leu Cys Pro Asn Ser Leu Leu Ala Asn Phe Ile Glu Leu
 210 215 220

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

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

Lys Asn Ile Asn
 260

<210> 46
<211> 298
<212> PRT
<213> Streptococcus entericus

<400> 46

Met Lys Lys Val Tyr Phe Cys His Thr Val Tyr His Leu Leu Ile Thr
1 5 10 15

Leu Cys Lys Ile Ser Val Glu Glu Gln Val Glu Ile Ile Val Phe Asp
20 25 30

Thr Val Ser Asn His Glu Leu Ile Val Gln Lys Ile Arg Asp Val Phe
35 40 45

Val Asn Thr Thr Val Leu Phe Ala Glu Gln Asn Thr Asp Phe Ser Ile
50 55 60

Leu Glu Ile Asp Arg Ala Thr Asp Ile Tyr Val Phe Asn Asp Trp Thr
65 70 75 80

Pro Ile Gly Ala Tyr Leu Arg Lys Asn Lys Leu Phe Tyr His Leu Ile
85 90 95

Glu Asp Gly Tyr Asn Tyr His Glu Tyr Asn Val Tyr Ala Asn Ala Leu
100 105 110

Thr Met Lys Arg Arg Leu Leu Asn Phe Val Leu Arg Arg Glu Glu Pro
115 120 125

Ser Gly Phe Ser Arg Tyr Val Arg Ser Ile Glu Val Asn Arg Val Lys
130 135 140

Tyr Leu Pro Asn Asp Cys Arg Lys Ser Lys Trp Val Glu Lys Pro Arg
145 150 155 160

Ser Ala Leu Phe Glu Asn Leu Val Pro Glu His Lys Gln Lys Ile Ile
165 170 175

Thr Ile Phe Gly Leu Glu Asn Tyr Gln Asp Ser Leu Arg Gly Val Leu
180 185 190

Val Leu Thr Gln Pro Leu Val Gln Asp Tyr Trp Asp Arg Asp Ile Thr
195 200 205

Thr Glu Glu Glu Gln Leu Glu Phe Tyr Arg Gln Ile Val Glu Ser Tyr
210 215 220

Gly Glu Gly Glu Gln Val Phe Phe Lys Ile His Pro Arg Asp Lys Val
225 230 235 240

Asp Tyr Ser Ser Leu Thr Asn Val Ile Phe Leu Lys Lys Asn Val Pro
245 250 255

Met Glu Val Tyr Glu Leu Ile Ala Asp Cys His Phe Thr Lys Gly Ile
260 265 270

Thr His Ser Ser Thr Ala Leu Asp Phe Leu Ser Cys Val Asp Lys Lys
275 280 285

Ile Thr Leu Lys Gln Met Lys Ala Asn Ser
290 295

<210> 47
<211> 295
<212> PRT
<213> Haemophilus ducreyi

<400> 47

Met Lys Glu Ile Ala Ile Ile Ser Asn Gln Arg Met Phe Phe Leu Tyr
1 5 10 15

Cys Leu Leu Thr Asn Lys Asn Val Glu Asp Val Phe Phe Ile Phe Glu
20 25 30

Lys Gly Ala Met Pro Asn Asn Leu Thr Ser Ile Ser His Phe Ile Val
35 40 45

Leu Asp His Ser Lys Ser Glu Cys Tyr Asp Phe Phe Tyr Phe Asn Phe
50 55 60

Ile Ser Cys Lys Tyr Arg Leu Arg Gly Leu Asp Val Tyr Gly Ala Asp

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

Lys Leu Leu Asp Phe Phe Asp
290 295

<210> 48
<211> 488
<212> PRT
<213> Alistipes sp.

<400> 48

Met Ala Leu Leu Ser Gly Thr Ala Ala Cys Ser Asp Asp Glu Val Ser
1 5 10 15

Gln Asn Leu Ile Val Ile Asn Gly Gly Glu His Phe Leu Ser Leu Asp
20 25 30

Gly Leu Ala Arg Ala Gly Lys Ile Ser Val Leu Ala Pro Ala Pro Trp
35 40 45

Arg Val Thr Lys Ala Ala Gly Asp Thr Trp Phe Arg Leu Ser Ala Thr
50 55 60

Glu Gly Pro Ala Gly Tyr Ser Glu Val Glu Leu Ser Leu Asp Glu Asn
65 70 75 80

Pro Gly Ala Ala Arg Ser Ala Gln Leu Ala Phe Ala Cys Gly Asp Ala
85 90 95

Ile Val Pro Phe Arg Leu Ser Gln Gly Ala Leu Ser Ala Gly Tyr Asp
100 105 110

Ser Pro Asp Tyr Tyr Phe Tyr Val Thr Phe Gly Thr Met Pro Thr Leu
115 120 125

Tyr Ala Gly Ile His Leu Leu Ser His Asp Lys Pro Gly Tyr Val Phe
130 135 140

Tyr Ser Arg Ser Lys Thr Phe Asp Pro Ala Glu Phe Pro Ala Arg Ala
145 150 155 160

Glu Val Thr Thr Ala Ala Asp Arg Thr Ala Asp Ala Thr Gln Ala Glu
165 170 175

Met Glu Ala Met Ala Arg Glu Met Lys Arg Arg Ile Leu Glu Ile Asn
180 185 190

Ser Ala Asp Pro Thr Ala Val Phe Gly Leu Tyr Val Asp Asp Leu Arg
195 200 205

Cys Arg Ile Gly Tyr Asp Trp Phe Val Ala Gln Gly Ile Asp Ser Ala
210 215 220

Arg Val Lys Val Ser Met Leu Ser Asp Gly Thr Gly Thr Tyr Asn Asn
225 230 235 240

Phe Tyr Asn Tyr Phe Gly Asp Ala Ala Thr Ala Glu Gln Asn Trp Glu
245 250 255

Ser Tyr Ala Ser Glu Val Glu Ala Leu Asp Trp Asn His Gly Gly Arg
260 265 270

Tyr Pro Glu Thr Arg Ser Leu Pro Glu Phe Glu Ser Tyr Thr Trp Pro
275 280 285

Tyr Tyr Leu Ser Thr Arg Pro Asp Tyr Arg Leu Val Val Gln Asp Gly
290 295 300

Ser Leu Leu Glu Ser Ser Cys Pro Phe Ile Thr Glu Lys Leu Gly Glu
305 310 315 320

Met Glu Ile Glu Ser Ile Gln Pro Tyr Glu Met Leu Ser Ala Leu Pro
325 330 335

Glu Ser Ser Arg Lys Arg Phe Tyr Asp Met Ala Gly Phe Asp Tyr Asp
340 345 350

Lys Phe Ala Ala Leu Phe Asp Ala Ser Pro Lys Lys Asn Leu Ile Ile
355 360 365

Ile Gly Thr Ser His Ala Asp Asp Ala Ser Ala Arg Leu Gln Arg Asp
370 375 380

Tyr Val Ala Arg Ile Met Glu Gln Tyr Gly Ala Gln Tyr Asp Val Phe
385 390 395 400

Phe Lys Pro His Pro Ala Asp Thr Thr Ser Ala Gly Tyr Glu Thr Glu
405 410 415

Phe Pro Gly Leu Thr Leu Leu Pro Gly Gln Met Pro Phe Glu Ile Phe
420 425 430

Val Trp Ser Leu Ile Asp Arg Val Asp Met Ile Gly Gly Tyr Pro Ser
435 440 445

Thr Val Phe Leu Thr Val Pro Val Asp Lys Val Arg Phe Ile Phe Ala
450 455 460

Ala Asp Ala Ala Ser Leu Val Arg Pro Leu Asn Ile Leu Phe Arg Asp
465 470 475 480

Ala Thr Asp Val Glu Trp Met Gln
485

<210> 49
<211> 291
<212> PRT
<213> Campylobacter jejuni

<400> 49

Met Lys Lys Val Ile Ile Ala Gly Asn Gly Pro Ser Leu Lys Glu Ile
1 5 10 15

Asp Tyr Ser Arg Leu Pro Asn Asp Phe Asp Val Phe Arg Cys Asn Gln
20 25 30

Phe Tyr Phe Glu Asp Lys Tyr Tyr Leu Gly Lys Lys Cys Lys Ala Val
35 40 45

Phe Tyr Thr Pro Asn Phe Phe Phe Glu Gln Tyr Tyr Thr Leu Lys His
50 55 60

Leu Ile Gln Asn Gln Glu Tyr Glu Thr Glu Leu Ile Met Cys Ser Asn
65 70 75 80

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

Asp Tyr Phe Pro Asp Ala His Leu Gly Tyr Asp Phe Phe Lys Gln Leu
100 105 110

Lys Glu Phe Asn Ala Tyr Phe Lys Phe His Glu Ile Tyr Phe Asn Gln
115 120 125

Arg Ile Thr Ser Gly Val Tyr Met Cys Ala Val Ala Ile Ala Leu Gly
130 135 140

Tyr Lys Glu Ile Tyr Leu Ser Gly Ile Asp Phe Tyr Gln Asn Gly Ser
145 150 155 160

Ser Tyr Ala Phe Asp Thr Lys Gln Glu Asn Leu Leu Lys Leu Ala Pro
165 170 175

Asp Phe Lys Asn Asp Arg Ser His Tyr Ile Gly His Ser Lys Asn Thr
180 185 190

Asp Ile Lys Ala Leu Glu Phe Leu Glu Lys Thr Tyr Lys Ile Lys Leu
195 200 205

Tyr Cys Leu Cys Pro Asn Ser Leu Leu Ala Asn Phe Ile Glu Leu Ala
210 215 220

Pro Asn Leu Asn Ser Asn Phe Ile Ile Gln Glu Lys Asn Asn Tyr Thr
225 230 235 240

Lys Asp Ile Leu Ile Pro Ser Ser Glu Ala Tyr Gly Lys Phe Ser Lys
245 250 255

Asn Ile Asn Phe Lys Lys Ile Lys Ile Lys Glu Asn Val Tyr Tyr Lys
260 265 270

Leu Ile Lys Asp Leu Leu Arg Leu Pro Ser Asp Ile Lys His Tyr Phe
275 280 285

Lys Gly Lys

290

<210> 50
<211> 312
<212> PRT
<213> Streptococcus agalactiae

<400> 50

Met Thr Asn Arg Lys Ile Tyr Val Cys His Thr Leu Tyr His Leu Leu
1 5 10 15

Ile Cys Leu Tyr Lys Glu Glu Ile Tyr Ser Asn Leu Glu Ile Ile Leu
20 25 30

Ser Ser Ser Ile Pro Asp Val Asp Asn Leu Glu Lys Lys Leu Lys Ser
35 40 45

Lys Thr Ile Asn Ile His Ile Leu Glu Glu Ser Ser Gly Glu Ser Glu
50 55 60

Glu Leu Leu Ser Val Leu Lys Asp Ala Gly Leu Ser Tyr Ser Lys Phe
65 70 75 80

Asp Ser Asn Cys Phe Ile Phe Asn Asp Ala Thr Pro Ile Gly Arg Thr
85 90 95

Leu Ile Lys His Gly Ile Tyr Tyr Asn Leu Ile Glu Asp Gly Leu Asn
100 105 110

Cys Phe Thr Tyr Ser Ile Phe Ser Gln Lys Leu Trp Lys Tyr Tyr Val
115 120 125

Lys Lys Tyr Ile Leu His Lys Ile Gln Pro His Gly Phe Ser Arg Tyr
130 135 140

Cys Leu Gly Ile Glu Val Asn Ser Leu Val Asn Leu Pro Lys Asp Pro
145 150 155 160

Arg Tyr Lys Lys Phe Ile Glu Val Pro Arg Lys Glu Leu Phe Asp Asn
165 170 175

Val Thr Glu Tyr Gln Lys Glu Met Ala Ile Asn Leu Phe Gly Ala Val
180 185 190

Arg Val Ser Ile Lys Ser Pro Ser Val Leu Val Leu Thr Gln Pro Leu
195 200 205

Ser Ile Asp Lys Glu Phe Met Ser Tyr Asn Asn Lys Ile Glu Thr Ser
210 215 220

Glu Glu Gln Phe Asn Phe Tyr Lys Ser Ile Val Asn Glu Tyr Ile Asn
225 230 235 240

Lys Gly Tyr Asn Val Tyr Leu Lys Val His Pro Arg Asp Val Val Asp
245 250 255

Tyr Ser Lys Leu Pro Val Glu Leu Leu Pro Ser Asn Val Pro Met Glu
260 265 270

Ile Ile Glu Leu Met Leu Thr Gly Arg Phe Glu Cys Gly Ile Thr His
275 280 285

Ser Ser Thr Ala Leu Asp Phe Leu Thr Cys Val Asp Lys Lys Ile Thr
290 295 300

Leu Val Asp Leu Lys Asp Ile Lys
305 310

<210> 51
<211> 410
<212> PRT
<213> Bibersteinia trehalosi

<400> 51

Met Glu Phe Cys Lys Met Ala Thr Thr Gln Lys Ile Cys Val Tyr Leu
1 5 10 15

Asp Tyr Ala Thr Ile Pro Ser Leu Asn Tyr Ile Leu His Phe Ala Gln
20 25 30

His Phe Glu Asp Gln Glu Thr Ile Arg Leu Phe Gly Leu Ser Arg Phe
35 40 45

His Ile Pro Glu Ser Val Ile Gln Arg Tyr Pro Lys Gly Val Val Gln
50 55 60

Phe Tyr Pro Asn Gln Glu Lys Asp Phe Ser Ala Leu Leu Leu Ala Leu
65 70 75 80

Lys Asn Ile Leu Ile Glu Val Lys Gln Gln Arg Lys Cys Glu Ile
85 90 95

Glu Leu His Leu Asn Leu Phe His Tyr Gln Leu Leu Leu Leu Pro Phe
100 105 110

Leu Ser Leu Tyr Leu Asp Thr Gln Asp Tyr Cys His Leu Thr Leu Lys
115 120 125

Phe Tyr Asp Asp Gly Ser Glu Ala Ile Ser Ala Leu Gln Glu Leu Ala
130 135 140

Leu Ala Pro Asp Leu Ala Ala Gln Ile Gln Phe Glu Lys Gln Gln Phe
145 150 155 160

Asp Glu Leu Val Val Lys Lys Ser Phe Lys Leu Ser Leu Leu Ser Arg
165 170 175

Tyr Phe Trp Gly Lys Leu Phe Glu Ser Glu Tyr Ile Trp Phe Asn Gln
180 185 190

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

Ser Ser Arg Gln Met Asp Phe Ala Ile Tyr Gln Gln Met Ser Asp Glu
210 215 220

Gln Lys Gln Leu Val Leu Glu Ile Leu Asn Ile Asp Leu Asn Lys Val
225 230 235 240

Ala Tyr Leu Lys Gln Leu Met Glu Asn Gln Pro Ser Phe Leu Phe Leu
245 250 255

Gly Thr Thr Leu Phe Asn Ile Thr Gln Glu Thr Lys Thr Trp Leu Met

260

265

270

Gln Met His Val Asp Leu Ile Gln Gln Tyr Cys Leu Pro Ser Gly Gln
 275 280 285

Phe Phe Asn Asn Lys Ala Gly Tyr Leu Cys Phe Tyr Lys Gly His Pro
 290 295 300

Asn Glu Lys Glu Met Asn Gln Met Ile Leu Ser Gln Phe Lys Asn Leu
 305 310 315 320

Ile Ala Leu Pro Asp Asp Ile Pro Leu Glu Ile Leu Leu Leu Leu Gly
 325 330 335

Val Ile Pro Ser Lys Val Gly Gly Phe Ala Ser Ser Ala Leu Phe Asn
 340 345 350

Phe Thr Pro Ala Gln Ile Glu Asn Ile Ile Phe Phe Thr Pro Arg Tyr
 355 360 365

Phe Glu Lys Asp Asn Arg Leu His Ala Thr Gln Tyr Arg Leu Met Gln
 370 375 380

Gly Leu Ile Glu Leu Gly Tyr Leu Asp Ala Glu Lys Ser Val Thr His
 385 390 395 400

Phe Glu Ile Met Gln Leu Leu Thr Lys Glu
 405 410

<210> 52

<211> 406

<212> PRT

<213> Haemophilus parahaemolyticus

<400> 52

Met Thr Glu Gln Tyr Ile Lys Asn Val Glu Val Tyr Leu Asp Tyr Ala
 1 5 10 15

Thr Ile Pro Thr Leu Asn Tyr Phe Tyr His Phe Thr Glu Asn Lys Asp
 20 25 30

Asp Ile Ala Thr Ile Arg Leu Phe Gly Leu Gly Arg Phe Asn Ile Ser
35 40 45

Lys Ser Ile Ile Glu Ser Tyr Pro Glu Gly Ile Ile Arg Tyr Cys Pro
50 55 60

Ile Ile Phe Glu Asp Gln Thr Ala Phe Gln Gln Leu Phe Ile Thr Leu
65 70 75 80

Leu Thr Glu Asp Ser Phe Cys Gln Tyr Arg Phe Asn Phe His Ile Asn
85 90 95

Leu Phe His Ser Trp Lys Met Leu Ile Pro Leu Leu His Ile Ile Trp
100 105 110

Gln Phe Lys His Lys Val Leu Asp Ile Lys Leu Asn Phe Tyr Asp Asp
115 120 125

Gly Ser Glu Gly Leu Val Thr Leu Ser Lys Ile Glu Gln Asn Tyr Ser
130 135 140

Ser Glu Ile Leu Gln Lys Ile Ile Asp Ile Asp Ser Gln Ser Phe Tyr
145 150 155 160

Ala Asp Lys Leu Ser Phe Leu Asp Glu Asp Ile Ala Arg Tyr Leu Trp
165 170 175

Asn Ser Leu Phe Glu Ser His Tyr Tyr Leu Leu Asn Asp Phe Leu Leu
180 185 190

Lys Asn Glu Lys Leu Ser Leu Leu Lys Asn Ser Ile Lys Tyr Cys His
195 200 205

Ile Met Asp Leu Glu Arg Tyr Leu Gln Phe Thr Gln Glu Glu Lys Asp
210 215 220

Phe Phe Asn Glu Leu Leu Gly Ile Asn Ile Gln Ser Leu Glu Asp Lys
225 230 235 240

Ile Lys Ile Phe Gln Gln Lys Lys Thr Phe Ile Phe Thr Gly Thr Thr
245 250 255

Ile Phe Ser Leu Pro Lys Glu Glu Glu Glu Thr Leu Tyr Arg Leu His
260 265 270

Leu Asn Ala Ile Leu Asn Tyr Ile His Pro Asn Gly Lys Tyr Phe Ile
275 280 285

Gly Asp Gly Phe Thr Leu Val Ile Lys Gly His Pro His Gln Lys Glu
290 295 300

Met Asn Ser Arg Leu Glu Lys Ser Phe Glu Lys Ala Val Met Leu Pro
305 310 315 320

Asp Asn Ile Pro Phe Glu Ile Leu Tyr Leu Ile Gly Cys Lys Pro Asp
325 330 335

Lys Ile Gly Gly Phe Val Ser Thr Ser Tyr Phe Ser Cys Asp Lys Lys
340 345 350

Asn Ile Ala Asp Leu Leu Phe Ile Ser Ala Arg Gln Glu Glu Val Arg
355 360 365

Lys Asn Asp Tyr Leu Phe Asn Ile Gln Tyr Gln Leu Arg Asp Met Met
370 375 380

Ile Lys Thr Gly Phe Ile Gln Glu Glu Lys Thr His Phe Tyr Ser Asp
385 390 395 400

Ile Pro Ile Phe Ile Ser
405

<210> 53
<211> 300
<212> PRT
<213> Haemophilus somnus

<400> 53

Met Lys Tyr Asn Ile Lys Ile Lys Ala Ile Val Ile Val Ser Ser Leu
1 5 10 15

Arg Met Leu Leu Ile Phe Leu Met Leu Asn Lys Tyr His Leu Asp Glu

20

25

30

Val Leu Phe Val Phe Asn Glu Gly Phe Glu Leu His Lys Lys Tyr Lys
 35 40 45

Ile Lys His Tyr Val Ala Ile Lys Lys Lys Ile Thr Lys Phe Trp Arg
 50 55 60

Leu Tyr Tyr Lys Leu Tyr Phe Tyr Arg Phe Lys Ile Asp Arg Ile Pro
 65 70 75 80

Val Tyr Gly Ala Asp His Leu Gly Trp Thr Asp Tyr Phe Leu Lys Tyr
 85 90 95

Phe Asp Phe Tyr Leu Ile Glu Asp Gly Ile Ala Asn Phe Ser Pro Lys
 100 105 110

Arg Tyr Glu Ile Asn Leu Thr Arg Asn Ile Pro Val Phe Gly Phe His
 115 120 125

Lys Thr Val Lys Lys Ile Tyr Leu Thr Ser Leu Glu Asn Val Pro Ser
 130 135 140

Asp Ile Arg His Lys Val Glu Leu Ile Ser Leu Glu His Leu Trp Lys
 145 150 155 160

Thr Arg Thr Ala Gln Glu Gln His Asn Ile Leu Asp Phe Phe Ala Phe
 165 170 175

Asn Leu Asp Ser Leu Ile Ser Leu Lys Met Lys Lys Tyr Ile Leu Phe
 180 185 190

Thr Gln Cys Leu Ser Glu Asp Arg Val Ile Ser Glu Gln Glu Lys Ile
 195 200 205

Ala Ile Tyr Gln His Ile Ile Lys Asn Tyr Asp Glu Arg Leu Leu Val
 210 215 220

Ile Lys Pro His Pro Arg Glu Thr Thr Asp Tyr Gln Lys Tyr Phe Glu
 225 230 235 240

Asn Val Phe Val Tyr Gln Asp Val Val Pro Ser Glu Leu Phe Glu Leu
245 250 255

Leu Asp Val Asn Phe Glu Arg Val Ile Thr Leu Phe Ser Thr Ala Val
260 265 270

Phe Lys Tyr Asp Arg Asn Ile Val Asp Phe Tyr Gly Thr Arg Ile His
275 280 285

Asp Lys Ile Tyr Gln Trp Phe Gly Asp Ile Lys Phe
290 295 300

<210> 54
<211> 381
<212> PRT
<213> *Vibrio harveyi*

<400> 54

Met Asp Ser Ser Pro Glu Asn Thr Ser Ser Thr Leu Glu Ile Tyr Ile
1 5 10 15

Asp Ser Ala Thr Leu Pro Ser Leu Gln His Met Val Lys Ile Ile Asp
20 25 30

Glu Gln Ser Gly Asn Lys Lys Leu Ile Asn Trp Lys Arg Tyr Pro Ile
35 40 45

Asp Asp Glu Leu Leu Leu Asp Lys Ile Asn Ala Leu Ser Phe Ser Asp
50 55 60

Thr Thr Asp Leu Thr Arg Tyr Met Glu Ser Ile Leu Leu Ile Gly Asp
65 70 75 80

Ile Lys Arg Val Val Ile Asn Gly Asn Ser Leu Ser Asn Tyr Asn Ile
85 90 95

Val Gly Val Met Arg Ser Ile Asn Ala Leu Gly Leu Asp Leu Asp Val
100 105 110

Glu Ile Asn Phe Tyr Asp Asp Gly Ser Ala Glu Tyr Val Arg Leu Tyr
115 120 125

Asn Phe Ser Gln Leu Pro Glu Ala Glu Arg Glu Leu Leu Val Ser Met
130 135 140

Ser Lys Asn Asn Ile Leu Ala Ala Val Asn Gly Ile Gly Ser Tyr Asp
145 150 155 160

Ser Gly Ser Pro Glu Asn Ile Tyr Gly Phe Ala Gln Ile Tyr Pro Ala
165 170 175

Thr Tyr His Met Leu Arg Ala Asp Ile Phe Asp Thr Asp Leu Glu Ile
180 185 190

Gly Leu Ile Arg Asp Ile Leu Gly Asp Asn Val Lys Gln Met Lys Trp
195 200 205

Gly Gln Phe Leu Gly Phe Asn Glu Glu Gln Lys Glu Leu Phe Tyr Gln
210 215 220

Leu Thr Ser Phe Asn Pro Asp Lys Ile Gln Ala Gln Tyr Lys Glu Ser
225 230 235 240

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

Ala Glu Gln Gln Ile Asn Ile Ile Lys Glu Ala Lys Lys Leu Asp Ser
260 265 270

Glu Ile Ile Pro Asn Ser Ile Asp Gly Tyr Asp Leu Phe Phe Lys Gly
275 280 285

His Pro Ser Ala Thr Tyr Asn Gln Gln Ile Val Asp Ala His Asp Met
290 295 300

Thr Glu Ile Tyr Asn Arg Thr Pro Phe Glu Val Leu Ala Met Thr Ser
305 310 315 320

Ser Leu Pro Asp Ala Val Gly Gly Met Gly Ser Ser Leu Phe Phe Ser
325 330 335

Leu Pro Lys Thr Val Glu Thr Lys Phe Ile Phe Tyr Lys Ser Gly Thr
340 345 350

Asp Ile Glu Ser Asn Ala Leu Ile Gln Val Met Leu Lys Leu Gly Ile
355 360 365

Ile Thr Asp Glu Lys Val Arg Phe Thr Thr Asp Ile Lys
370 375 380

<210> 55
<211> 483
<212> PRT
<213> Alistipes sp.

<400> 55

Met Ala Ser Cys Ser Asp Asp Asp Lys Glu Gln Thr Gly Phe Gln Ile
1 5 10 15

Asp Asp Gly Ser Gly Phe Leu Ser Leu Asp Ala Ala Ala Arg Ser Gly
20 25 30

Ser Ile Ala Ile Thr Ala Asn Asn Ser Trp Ser Val Thr Gln Asp Lys
35 40 45

Asp Ser Glu Trp Leu Thr Leu Ser Thr Thr Ser Gly Ala Ala Gly Arg
50 55 60

Thr Glu Ile Gly Ile Met Leu Glu Ala Asn Pro Gly Glu Ala Arg Asn
65 70 75 80

Ala Gly Leu Thr Phe Asn Ser Gly Gly Arg Thr Tyr Pro Phe Val Ile
85 90 95

Thr Gln Ser Ala His Val Thr Ala Asp Phe Asp Asp Ala Asp His Cys
100 105 110

Phe Tyr Ile Thr Phe Gly Thr Leu Pro Thr Leu Tyr Ala Gly Leu His
115 120 125

Val Leu Ser His Asp Lys Pro Ser Tyr Val Phe Phe Gln Arg Ser Gln
130 135 140

Thr Phe Arg Pro Glu Glu Phe Pro Ala His Ala Glu Val Thr Ile Ala
145 150 155 160

Ala Asp Pro Ser Ala Asn Ala Thr Asp Glu Asp Met Glu Arg Met Arg
165 170 175

Thr Ala Met Lys Gln Gln Ile Leu Lys Ile Asn Val Glu Asp Pro Thr
180 185 190

Ala Val Phe Gly Leu Tyr Val Asp Asp Leu Arg Cys Gly Ile Gly Tyr
195 200 205

Asp Trp Phe Val Ala Gln Gly Ile Asp Ser Thr Arg Val Lys Val Ser
210 215 220

Met Leu Ser Asp Gly Thr Gly Thr Tyr Asn Asn Phe Tyr Asn Tyr Phe
225 230 235 240

Gly Asp Pro Ala Thr Ala Glu Gln Asn Trp Glu Asn Tyr Ala Ala Gln
245 250 255

Val Glu Ala Leu Asp Trp Gln His Gly Gly Arg Phe Pro Glu Thr Arg
260 265 270

Met Pro Asp Gly Phe Asp Phe Tyr Glu Trp Pro Tyr Tyr Leu Ala Thr
275 280 285

Arg Pro Asn Tyr Arg Leu Val Leu Gln Asp Asp Asp Leu Leu Glu Ala
290 295 300

Thr Ser Pro Phe Met Thr Glu Arg Leu Gln Gln Met Arg Thr Glu Ser
305 310 315 320

Lys Gln Pro Tyr Glu Leu Leu Ala Ser Leu Pro Ala Glu Ala Arg Gln
325 330 335

Arg Phe Phe Arg Met Ala Gly Phe Asp Tyr Asp Ala Phe Ala Ala Leu
340 345 350

Phe Asp Ala Ser Pro Lys Lys Asn Leu Val Ile Ile Gly Thr Ser His

355

360

365

Thr Ser Glu Glu Ser Glu Ala Gln Gln Ala Ala Tyr Val Glu Arg Ile
 370 375 380

Ile Gly Asp Tyr Gly Thr Ala Tyr Asp Ile Phe Phe Lys Pro His Pro
 385 390 395 400

Ala Asp Ser Ser Ser Ser Asn Tyr Glu Glu Arg Phe Glu Gly Leu Thr
 405 410 415

Leu Leu Pro Gly Gln Met Pro Phe Glu Ile Phe Val Trp Ser Leu Leu
 420 425 430

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

Val Pro Val Glu Lys Thr Gly Phe Ile Phe Ala Ala Asn Ala Glu Ser
 450 455 460

Leu Pro Arg Pro Leu Asn Val Leu Phe Arg Asn Ala Glu His Val Arg
 465 470 475 480

Trp Ile Gln

<210> 56

<211> 483

<212> PRT

<213> Alistipes shahii

<400> 56

Met Asp Asp Gly Thr Pro Ser Val Ser Ile Asn Gly Gly Thr Asp Phe
 1 5 10 15

Leu Ser Leu Asp His Leu Ala Arg Ser Gly Lys Ile Thr Val Asn Ala
 20 25 30

Pro Ala Pro Trp Ser Val Thr Leu Ala Pro Glu Asn Tyr Gly Gln Asp
 35 40 45

Glu Lys Pro Asp Trp Leu Thr Leu Ser Ala Glu Glu Gly Pro Ala Gly
50 55 60

Tyr Ser Glu Ile Asp Val Thr Phe Ala Glu Asn Pro Gly Pro Ala Arg
65 70 75 80

Ser Ala Ser Leu Leu Phe Ser Cys Asp Gly Lys Thr Leu Ala Phe Thr
85 90 95

Val Ser Gln Ser Ala Gly Gly Thr Gly Phe Asp Ala Pro Asp Tyr Tyr
100 105 110

Phe Tyr Ile Ser Val Gly Thr Met Pro Thr Leu Tyr Ser Gly Leu His
115 120 125

Leu Leu Ser His Asp Lys Pro Ser Tyr Val Ser Tyr Glu Arg Ala Ser
130 135 140

Thr Phe Asp Ala Ala Glu Phe Pro Asp Arg Ala Phe Val Tyr Pro Val
145 150 155 160

Ala Asp Pro Thr Gly His Ala Thr Asn Glu Glu Leu Arg Ala Met Ser
165 170 175

Glu Ala Met Lys Arg Arg Ile Leu Glu Ile Asn Ala Glu Asp Pro Thr
180 185 190

Ala Val Phe Gly Leu Trp Val Asp Asp Leu Arg Cys Arg Leu Gly Tyr
195 200 205

Asp Trp Phe Val Ala Gln Gly Ile Asp Ser Ala Arg Val Lys Val Thr
210 215 220

Met Leu Ser Asp Gly Thr Ala Thr Tyr Asn Asn Phe His Asn Tyr Phe
225 230 235 240

Gly Asp Ala Ala Thr Ala Glu Gln Asn Trp Asn Asp Tyr Ala Ala Glu
245 250 255

Val Glu Ala Leu Asp Trp Asn His Gly Gly Arg Tyr Pro Glu Thr Arg
260 265 270

Ala Pro Glu Glu Phe Ala Ser Tyr Thr Trp Pro Tyr Tyr Leu Ser Thr
275 280 285

Arg Pro Asp Tyr Arg Leu Met Leu Gln Asn Ser Ser Leu Met Glu Ser
290 295 300

Ser Cys Pro Phe Ile Ala Asp Arg Leu Ala Ala Met Lys Met Glu Ser
305 310 315 320

Val Gln Pro Tyr Glu Leu Leu Thr Ala Leu Pro Glu Ala Ser Lys Gln
325 330 335

Gln Phe Tyr Arg Met Ala Lys Phe Asp Tyr Ala Arg Phe Ala Gly Leu
340 345 350

Phe Asp Leu Ser Pro Lys Lys Asn Leu Ile Ile Ile Gly Thr Ser His
355 360 365

Ser Ser Ala Ala Ser Glu Gln Gln Gln Ala Ala Tyr Val Glu Arg Ile
370 375 380

Ile Gln Gln Tyr Gly Ser Asp Tyr Asp Ile Phe Phe Lys Pro His Pro
385 390 395 400

Ala Asp Ser Ser Ser Ala Gly Tyr Pro Asp Arg Phe Glu Gly Leu Thr
405 410 415

Leu Leu Pro Gly Gln Met Pro Phe Glu Ile Phe Val Trp Ala Leu Leu
420 425 430

Asp Lys Ile Asp Met Ile Gly Gly Tyr Pro Ser Thr Thr Phe Ile Ser
435 440 445

Val Pro Leu Asp Lys Val Gly Phe Leu Phe Ala Ala Asp Ala Asp Gly
450 455 460

Leu Val Arg Pro Leu Asn Ile Leu Phe Arg Asp Ala Ala Asn Val Glu
465 470 475 480

Trp Ile Gln

<210> 57

<211> 401

<212> PRT

<213> Actinobacillus suis

<400> 57

Met Glu Arg Thr Pro Gln Leu Gln Ala Val Asp Ile Tyr Ile Asp Phe
1 5 10 15

Ala Thr Ile Pro Ser Leu Ser Tyr Phe Leu His Phe Leu Lys His Lys
20 25 30

His Asp Asp Gln Arg Leu Arg Leu Phe Ser Leu Ala Arg Phe Glu Met
35 40 45

Pro Gln Thr Leu Ile Glu Gln Tyr Glu Gly Ile Ile Gln Phe Ser Arg
50 55 60

Asn Val Glu His Asn Val Glu Pro Leu Leu Glu Gln Leu Gln Thr Ile
65 70 75 80

Leu Ser Gln Glu Gly Lys Gln Phe Glu Leu His Leu His Leu Asn Leu
85 90 95

Phe His Ser Phe Glu Met Phe Leu Asn Leu Ser Pro Thr Tyr Thr Gln
100 105 110

Tyr Lys Glu Lys Ile Ser Lys Ile Val Leu His Leu Tyr Asp Asp Gly
115 120 125

Ser Glu Gly Val Met Lys Gln Tyr Gln Leu Gln Lys Ser Ser Ser Leu
130 135 140

Val Gln Asp Leu Ala Ala Thr Lys Ala Ser Leu Val Ser Leu Phe Glu
145 150 155 160

Asn Gly Glu Gly Ser Phe Ser Gln Ile Asp Leu Ile Arg Tyr Val Trp
165 170 175

Asn Ala Val Leu Glu Thr His Tyr Tyr Leu Leu Ser Asp His Phe Leu
180 185 190

Leu Asp Glu Lys Leu Gln Pro Leu Lys Ala Glu Leu Gly His Tyr Gln
195 200 205

Leu Leu Asn Leu Ser Ala Tyr Gln Tyr Leu Ser Ser Glu Asp Leu Leu
210 215 220

Trp Leu Lys Gln Ile Leu Lys Ile Asp Thr Glu Leu Glu Ser Leu Met
225 230 235 240

Gln Lys Leu Thr Ala Gln Pro Val Tyr Phe Phe Ser Gly Thr Thr Phe
245 250 255

Phe Asn Ile Ser Phe Glu Asp Lys Gln Arg Leu Ala Asn Ile His Ala
260 265 270

Ile Leu Ile Arg Glu His Leu Asp Pro Asn Ser Gln Leu Phe Ile Gly
275 280 285

Glu Pro Tyr Leu Phe Val Phe Lys Gly His Pro Asn Ser Pro Glu Ile
290 295 300

Asn Gln Ala Leu Arg Glu Tyr Tyr Pro Asn Val Ile Phe Leu Pro Glu
305 310 315 320

Asn Ile Pro Phe Glu Ile Leu Thr Leu Leu Gly Phe Ser Pro Gln Lys
325 330 335

Ile Gly Gly Phe Ala Ser Thr Ile His Val Asn Ser Glu Gln Ser Lys
340 345 350

Leu Ala Lys Leu Phe Phe Leu Thr Ser Thr Asp Glu Gln Glu Arg Gln
355 360 365

Leu Ser Asp Gly Tyr Ile Lys Gln Tyr Ala Leu Ala Gln Ala Met Leu
370 375 380

Glu Met Gln Leu Val Ser Gln Glu Gln Val Tyr Tyr Cys Ser Leu Ser

385 390 395 400

Ser

<210> 58
<211> 401
<212> PRT
<213> Actinobacillus capsulatus

<400> 58

Met Glu Arg Ile Pro Gln Leu Gln Ala Val Asp Ile Tyr Ile Asp Phe
1 5 10 15

Ala Thr Ile Pro Ser Leu Ser Tyr Phe Leu His Phe Leu Lys His Lys
20 25 30

His Asp His Gln Arg Leu Arg Leu Phe Ser Leu Ala Arg Phe Glu Met
35 40 45

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

Asn Val Glu His Asn Val Glu Gln Leu Leu Glu Gln Leu Gln Thr Ile
65 70 75 80

Leu Ser Gln Glu Gly Lys Gln Phe Glu Leu His Leu His Leu Asn Leu
85 90 95

Phe His Ser Phe Glu Met Phe Leu Asn Leu Ser Pro Thr Tyr Thr Lys
100 105 110

Tyr Lys Glu Lys Ile Ser Lys Ile Val Leu His Leu Tyr Asp Asp Gly
115 120 125

Ser Glu Gly Val Met Lys Gln Tyr Gln Leu Gln Gln Ser Asn Ser Leu
130 135 140

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

Asn Gly Glu Gly Ala Phe Ser Gln Ile Asp Leu Ile Arg Tyr Val Trp
165 170 175

Asn Ala Val Leu Glu Thr His Tyr Tyr Leu Leu Ser Asp His Phe Leu
180 185 190

Ala His Glu Lys Leu Gln Pro Leu Lys Ile Glu Leu Gly His Tyr Gln
195 200 205

Leu Leu Asn Leu Ser Ala Tyr Gln Tyr Leu Ser Ser Glu Asp Leu Leu
210 215 220

Trp Leu Lys Gln Ile Leu Lys Ile Asp Ala Glu Leu Glu Ser Leu Met
225 230 235 240

His Lys Leu Thr Thr Gln Pro Val Tyr Phe Phe Ser Gly Thr Thr Phe
245 250 255

Phe Asn Ile Ser Phe Glu Asp Lys Gln Arg Leu Ala Asn Ile His Ala
260 265 270

Ile Leu Ile Arg Glu His Leu Asp Pro Asn Ser Gln Leu Phe Ile Gly
275 280 285

Glu Pro Tyr Leu Phe Val Phe Lys Gly His Pro Asn Ser Pro Glu Ile
290 295 300

Asn Gln Ala Leu Arg Glu Tyr Tyr Pro Asn Ala Ile Phe Leu Pro Glu
305 310 315 320

Asn Ile Pro Phe Glu Ile Leu Thr Leu Leu Gly Phe Ser Pro Gln Lys
325 330 335

Ile Gly Gly Phe Ala Ser Thr Ile His Val Asn Ser Glu Gln Ser Lys
340 345 350

Leu Ala Lys Leu Phe Phe Leu Thr Ser Thr Asp Glu Gln Glu Arg Asn
355 360 365

Arg Ser Asp Gly Tyr Ile Lys Gln Tyr Ala Leu Ala Gln Ala Met Leu
370 375 380

Glu	Met	Gln	Leu	Val	Ser	Gln	Glu	Gln	Val	Tyr	Tyr	Cys	Ser	Leu	Ser
385					390					395					400

Ser

<210> 59
 <211> 311
 <212> PRT
 <213> Haemophilus somnus

<400> 59

Met	Phe	Arg	Glu	Asp	Asn	Met	Asn	Leu	Ile	Ile	Cys	Cys	Thr	Pro	Leu
1				5					10					15	

Gln	Val	Ile	Ile	Ala	Glu	Lys	Ile	Ile	Glu	Arg	Tyr	Pro	Glu	Gln	Lys
			20					25					30		

Phe	Tyr	Gly	Val	Met	Leu	Glu	Ser	Phe	Tyr	Asn	Asp	Lys	Phe	Asp	Phe
		35					40					45			

Tyr	Glu	Asn	Lys	Leu	Lys	His	Leu	Cys	His	Glu	Phe	Phe	Cys	Ile	Lys
	50					55					60				

Ile	Ala	Arg	Phe	Lys	Leu	Glu	Arg	Tyr	Lys	Asn	Leu	Leu	Ser	Leu	Leu
65					70					75					80

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

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

Tyr	Thr	Phe	Asp	Asp	Gly	Thr	Ala	Asn	Ile	Ala	Pro	Asn	Ser	His	Leu
		115					120					125			

Tyr	Gln	Glu	Tyr	Asp	His	Ser	Leu	Lys	Lys	Arg	Ile	Thr	Asp	Ile	Leu
	130					135					140				

Leu Pro Asn His Tyr Asn Ser Asn Lys Val Lys Asn Ile Ser Lys Leu

Pro Ser Leu Ala Cys Phe Met His Phe Ile Gln His Lys Asp Asp Val
20 25 30

Asp Ser Ile Arg Leu Phe Gly Leu Ala Arg Phe Asp Ile Pro Gln Ser
35 40 45

Ile Ile Asp Arg Tyr Pro Ala Asn His Leu Phe Tyr His Asn Ile Asp
50 55 60

Asn Arg Asp Leu Thr Ala Val Leu Asn Gln Leu Ala Asp Ile Leu Ala
65 70 75 80

Gln Glu Asn Lys Arg Phe Gln Ile Asn Leu His Leu Asn Leu Phe His
85 90 95

Ser Ile Asp Leu Phe Phe Ala Ile Tyr Pro Ile Tyr Gln Gln Tyr Gln
100 105 110

His Lys Ile Ser Thr Ile Gln Leu Gln Leu Tyr Asp Asp Gly Ser Glu
115 120 125

Gly Ile Val Thr Gln His Ser Leu Cys Lys Ile Ala Asp Leu Glu Gln
130 135 140

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

Thr Ala Asn Val Pro Asn Pro Thr Leu Leu Arg Tyr Leu Trp Asn Asn
165 170 175

Ile Ile Asp Ser Gln Phe His Leu Ile Ser Asp His Phe Leu Gln His
180 185 190

Pro Lys Leu Gln Pro Leu Lys Arg Leu Leu Lys Arg Tyr Thr Ile Leu
195 200 205

Asp Phe Thr Cys Tyr Pro Arg Phe Asn Ala Glu Gln Lys Gln Leu Leu
210 215 220

Lys Glu Ile Leu His Ile Ser Asn Glu Leu Glu Asn Leu Leu Lys Leu
225 230 235 240

Leu Lys Gln His Asn Thr Phe Leu Phe Thr Gly Thr Thr Ala Phe Asn
245 250 255

Leu Asp Gln Glu Lys Leu Asp Leu Leu Thr Gln Leu His Ile Leu Leu
260 265 270

Leu Asn Glu His Gln Asn Pro His Ser Thr His Tyr Ile Gly Asn Asn
275 280 285

Tyr Leu Leu Leu Ile Lys Gly His Ala Asn Ser Pro Ala Leu Asn His
290 295 300

Thr Leu Ala Leu His Phe Pro Asp Ala Ile Phe Leu Pro Ala Asn Ile
305 310 315 320

Pro Phe Glu Ile Phe Ala Met Leu Gly Phe Thr Pro Asn Lys Met Gly
325 330 335

Gly Phe Ala Ser Thr Ser Tyr Ile Asn Tyr Pro Thr Glu Asn Ile Asn
340 345 350

His Leu Phe Phe Leu Thr Ser Asp Gln Pro Ser Ile Arg Thr Lys Trp
355 360 365

Leu Asp Tyr Glu Lys Gln Phe Gly Leu Met Tyr Ser Leu Leu Ala Met
370 375 380

Gln Lys Ile Asn Glu Asp Gln Ala Phe Met Cys Thr Ile His Asn
385 390 395

<210> 61
<211> 497
<212> PRT
<213> Photobacterium leiognathi

<400> 61

Met Cys Asn Asp Asn Gln Asn Thr Val Asp Val Val Val Ser Thr Val
1 5 10 15

Asn Asp Asn Val Ile Glu Asn Asn Thr Tyr Gln Val Lys Pro Ile Asp

20

25

30

Thr Pro Thr Thr Phe Asp Ser Tyr Ser Trp Ile Gln Thr Cys Gly Thr
 35 40 45

Pro Ile Leu Lys Asp Asp Glu Lys Tyr Ser Leu Ser Phe Asp Phe Val
 50 55 60

Ala Pro Glu Leu Asp Gln Asp Glu Lys Phe Cys Phe Glu Phe Thr Gly
 65 70 75 80

Asp Val Asp Gly Lys Arg Tyr Val Thr Gln Thr Asn Leu Thr Val Val
 85 90 95

Ala Pro Thr Leu Glu Val Tyr Val Asp His Ala Ser Leu Pro Ser Leu
 100 105 110

Gln Gln Leu Met Lys Ile Ile Gln Gln Lys Asn Glu Tyr Ser Gln Asn
 115 120 125

Glu Arg Phe Ile Ser Trp Gly Arg Ile Gly Leu Thr Glu Asp Asn Ala
 130 135 140

Glu Lys Leu Asn Ala His Ile Tyr Pro Leu Ala Gly Asn Asn Thr Ser
 145 150 155 160

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

Leu Asn Leu Glu Leu Asn Thr Asn Thr Ala His Ser Phe Pro Asn Leu
 180 185 190

Ala Pro Ile Leu Arg Ile Ile Ser Ser Lys Ser Asn Ile Leu Ile Ser
 195 200 205

Asn Ile Asn Leu Tyr Asp Asp Gly Ser Ala Glu Tyr Val Asn Leu Tyr
 210 215 220

Asn Trp Lys Asp Thr Glu Asp Lys Ser Val Lys Leu Ser Asp Ser Phe
 225 230 235 240

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

Gly Ile Tyr Gly Arg Tyr Asn Trp His Gln Leu Tyr Asn Thr Ser Tyr
260 265 270

Tyr Phe Leu Arg Lys Asp Tyr Leu Thr Val Glu Pro Gln Leu His Asp
275 280 285

Leu Arg Glu Tyr Leu Gly Gly Ser Leu Lys Gln Met Ser Trp Asp Gly
290 295 300

Phe Ser Gln Leu Ser Lys Gly Asp Lys Glu Leu Phe Leu Asn Ile Val
305 310 315 320

Gly Phe Asp Gln Glu Lys Leu Gln Gln Glu Tyr Gln Gln Ser Glu Leu
325 330 335

Pro Asn Phe Val Phe Thr Gly Thr Thr Thr Trp Ala Gly Gly Glu Thr
340 345 350

Lys Glu Tyr Tyr Ala Gln Gln Gln Val Asn Val Val Asn Asn Ala Ile
355 360 365

Asn Glu Thr Ser Pro Tyr Tyr Leu Gly Arg Glu His Asp Leu Phe Phe
370 375 380

Lys Gly His Pro Arg Gly Gly Ile Ile Asn Asp Ile Ile Leu Gly Ser
385 390 395 400

Phe Asn Asn Met Ile Asp Ile Pro Ala Lys Val Ser Phe Glu Val Leu
405 410 415

Met Met Thr Gly Met Leu Pro Asp Thr Val Gly Gly Ile Ala Ser Ser
420 425 430

Leu Tyr Phe Ser Ile Pro Ala Glu Lys Val Ser Phe Ile Val Phe Thr
435 440 445

Ser Ser Asp Thr Ile Thr Asp Arg Glu Asp Ala Leu Lys Ser Pro Leu

450

455

460

Val Gln Val Met Met Thr Leu Gly Ile Val Lys Glu Lys Asp Val Leu
 465 470 475 480

Phe Trp Ser Asp Leu Pro Asp Cys Ser Ser Gly Val Cys Ile Ala Gln
 485 490 495

Tyr

<210> 62

<211> 498

<212> PRT

<213> Photobacterium sp.

<400> 62

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

Thr Ile Ile Asp Glu Glu Tyr Val Asn Leu Glu Pro Ile Asn Gln Ser
 20 25 30

Asn Ile Ser Phe Thr Lys His Ser Trp Val Gln Thr Cys Gly Thr Gln
 35 40 45

Gln Leu Leu Thr Glu Gln Asn Lys Glu Ser Ile Ser Leu Ser Val Val
 50 55 60

Ala Pro Arg Leu Asp Asp Asp Glu Lys Tyr Cys Phe Asp Phe Asn Gly
 65 70 75 80

Val Ser Asn Lys Gly Glu Lys Tyr Ile Thr Lys Val Thr Leu Asn Val
 85 90 95

Val Ala Pro Ser Leu Glu Val Tyr Val Asp His Ala Ser Leu Pro Thr
 100 105 110

Leu Gln Gln Leu Met Asp Ile Ile Lys Ser Glu Glu Glu Asn Pro Thr
 115 120 125

Ala Gln Arg Tyr Ile Ala Trp Gly Arg Ile Val Pro Thr Asp Glu Gln
130 135 140

Met Lys Glu Leu Asn Ile Thr Ser Phe Ala Leu Ile Asn Asn His Thr
145 150 155 160

Pro Ala Asp Leu Val Gln Glu Ile Val Lys Gln Ala Gln Thr Lys His
165 170 175

Arg Leu Asn Val Lys Leu Ser Ser Asn Thr Ala His Ser Phe Asp Asn
180 185 190

Leu Val Pro Ile Leu Lys Glu Leu Asn Ser Phe Asn Asn Val Thr Val
195 200 205

Thr Asn Ile Asp Leu Tyr Asp Asp Gly Ser Ala Glu Tyr Val Asn Leu
210 215 220

Tyr Asn Trp Arg Asp Thr Leu Asn Lys Thr Asp Asn Leu Lys Ile Gly
225 230 235 240

Lys Asp Tyr Leu Glu Asp Val Ile Asn Gly Ile Asn Glu Asp Thr Ser
245 250 255

Asn Thr Gly Thr Ser Ser Val Tyr Asn Trp Gln Lys Leu Tyr Pro Ala
260 265 270

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

His Glu Leu Arg Asp Tyr Ile Gly Asp Ser Leu Lys Gln Met Gln Trp
290 295 300

Asp Gly Phe Lys Lys Phe Asn Ser Lys Gln Gln Glu Leu Phe Leu Ser
305 310 315 320

Ile Val Asn Phe Asp Lys Gln Lys Leu Gln Asn Glu Tyr Asn Ser Ser
325 330 335

Asn Leu Pro Asn Phe Val Phe Thr Gly Thr Thr Val Trp Ala Gly Asn
340 345 350

His Glu Arg Glu Tyr Tyr Ala Lys Gln Gln Ile Asn Val Ile Asn Asn
355 360 365

Ala Ile Asn Glu Ser Ser Pro His Tyr Leu Gly Asn Ser Tyr Asp Leu
370 375 380

Phe Phe Lys Gly His Pro Gly Gly Gly Ile Ile Asn Thr Leu Ile Met
385 390 395 400

Gln Asn Tyr Pro Ser Met Val Asp Ile Pro Ser Lys Ile Ser Phe Glu
405 410 415

Val Leu Met Met Thr Asp Met Leu Pro Asp Ala Val Ala Gly Ile Ala
420 425 430

Ser Ser Leu Tyr Phe Thr Ile Pro Ala Glu Lys Ile Lys Phe Ile Val
435 440 445

Phe Thr Ser Thr Glu Thr Ile Thr Asp Arg Glu Thr Ala Leu Arg Ser
450 455 460

Pro Leu Val Gln Val Met Ile Lys Leu Gly Ile Val Lys Glu Glu Asn
465 470 475 480

Val Leu Phe Trp Ala Asp Leu Pro Asn Cys Glu Thr Gly Val Cys Ile
485 490 495

Ala Val

<210> 63

<211> 482

<212> PRT

<213> Photobacterium leiognathi

<400> 63

Met Asn Asp Asn Gln Asn Thr Val Asp Val Val Val Ser Thr Val Asn
1 5 10 15

Asp Asn Val Ile Glu Asn Asn Thr Tyr Gln Val Lys Pro Ile Asp Thr

20

25

30

Pro Thr Thr Phe Asp Ser Tyr Ser Trp Ile Gln Thr Cys Gly Thr Pro
 35 40 45

Ile Leu Lys Asp Asp Glu Lys Tyr Ser Leu Ser Phe Asp Phe Val Ala
 50 55 60

Pro Glu Leu Asp Gln Asp Glu Lys Phe Cys Phe Glu Phe Thr Gly Asp
 65 70 75 80

Val Asp Gly Lys Arg Tyr Val Thr Gln Thr Asn Leu Thr Val Val Ala
 85 90 95

Pro Thr Leu Glu Val Tyr Val Asp His Ala Ser Leu Pro Ser Leu Gln
 100 105 110

Gln Leu Met Lys Ile Ile Gln Gln Lys Asn Glu Tyr Ser Gln Asn Glu
 115 120 125

Arg Phe Ile Ser Trp Gly Arg Ile Arg Leu Thr Glu Asp Asn Ala Glu
 130 135 140

Lys Leu Asn Ala His Ile Tyr Pro Leu Ala Gly Asn Asn Thr Ser Gln
 145 150 155 160

Glu Leu Val Asp Ala Val Ile Asp Tyr Ala Asp Ser Lys Asn Arg Leu
 165 170 175

Asn Leu Glu Leu Asn Thr Asn Thr Gly His Ser Phe Arg Asn Ile Ala
 180 185 190

Pro Ile Leu Arg Ala Thr Ser Ser Lys Asn Asn Ile Leu Ile Ser Asn
 195 200 205

Ile Asn Leu Tyr Asp Asp Gly Ser Ala Glu Tyr Val Ser Leu Tyr Asn
 210 215 220

Trp Lys Asp Thr Asp Asn Lys Ser Gln Lys Leu Ser Asp Ser Phe Leu
 225 230 235 240

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

Ile Tyr Ser Ile Tyr Asn Trp His Gln Leu Tyr His Ser Ser Tyr Tyr
260 265 270

Phe Leu Arg Lys Asp Tyr Leu Thr Val Glu Thr Lys Leu His Asp Leu
275 280 285

Arg Glu Tyr Leu Gly Gly Ser Leu Lys Gln Met Ser Trp Asp Thr Phe
290 295 300

Ser Gln Leu Ser Lys Gly Asp Lys Glu Leu Phe Leu Asn Ile Val Gly
305 310 315 320

Phe Asp Gln Glu Lys Leu Gln Gln Glu Tyr Gln Gln Ser Glu Leu Pro
325 330 335

Asn Phe Val Phe Thr Gly Thr Thr Thr Trp Ala Gly Gly Glu Thr Lys
340 345 350

Glu Tyr Tyr Ala Gln Gln Gln Val Asn Val Val Asn Asn Ala Ile Asn
355 360 365

Glu Thr Ser Pro Tyr Tyr Leu Gly Arg Glu His Asp Leu Phe Phe Lys
370 375 380

Gly His Pro Arg Gly Gly Ile Ile Asn Asp Ile Ile Leu Gly Ser Phe
385 390 395 400

Asn Asn Met Ile Asp Ile Pro Ala Lys Val Ser Phe Glu Val Leu Met
405 410 415

Met Thr Gly Met Leu Pro Asp Thr Val Gly Gly Ile Ala Ser Ser Leu
420 425 430

Tyr Phe Ser Ile Pro Ala Glu Lys Val Ser Phe Ile Val Phe Thr Ser
435 440 445

Ser Asp Thr Ile Thr Asp Arg Glu Asp Ala Leu Lys Ser Pro Leu Val

450

455

460

Gln Val Met Met Thr Leu Gly Ile Val Lys Glu Lys Asp Val Leu Phe
 465 470 475 480

Trp Cys

<210> 64

<211> 675

<212> PRT

<213> Photobacterium damsela

<400> 64

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

Asn Ser Asp Asn Thr Ser Leu Lys Glu Thr Val Ser Ser Asn Ser Ala
 20 25 30

Asp Val Val Glu Thr Glu Thr Tyr Gln Leu Thr Pro Ile Asp Ala Pro
 35 40 45

Ser Ser Phe Leu Ser His Ser Trp Glu Gln Thr Cys Gly Thr Pro Ile
 50 55 60

Leu Asn Glu Ser Asp Lys Gln Ala Ile Ser Phe Asp Phe Val Ala Pro
 65 70 75 80

Glu Leu Lys Gln Asp Glu Lys Tyr Cys Phe Thr Phe Lys Gly Ile Thr
 85 90 95

Gly Asp His Arg Tyr Ile Thr Asn Thr Thr Leu Thr Val Val Ala Pro
 100 105 110

Thr Leu Glu Val Tyr Ile Asp His Ala Ser Leu Pro Ser Leu Gln Gln
 115 120 125

Leu Ile His Ile Ile Gln Ala Lys Asp Glu Tyr Pro Ser Asn Gln Arg
 130 135 140

Phe Val Ser Trp Lys Arg Val Thr Val Asp Ala Asp Asn Ala Asn Lys
145 150 155 160

Leu Asn Ile His Thr Tyr Pro Leu Lys Gly Asn Asn Thr Ser Pro Glu
165 170 175

Met Val Ala Ala Ile Asp Glu Tyr Ala Gln Ser Lys Asn Arg Leu Asn
180 185 190

Ile Glu Phe Tyr Thr Asn Thr Ala His Val Phe Asn Asn Leu Pro Pro
195 200 205

Ile Ile Gln Pro Leu Tyr Asn Asn Glu Lys Val Lys Ile Ser His Ile
210 215 220

Ser Leu Tyr Asp Asp Gly Ser Ser Glu Tyr Val Ser Leu Tyr Gln Trp
225 230 235 240

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

Leu Ala Asn Tyr Leu Ala Gly Thr Ser Pro Asp Ala Pro Lys Gly Met
260 265 270

Gly Asn Arg Tyr Asn Trp His Lys Leu Tyr Asp Thr Asp Tyr Tyr Phe
275 280 285

Leu Arg Glu Asp Tyr Leu Asp Val Glu Ala Asn Leu His Asp Leu Arg
290 295 300

Asp Tyr Leu Gly Ser Ser Ala Lys Gln Met Pro Trp Asp Glu Phe Ala
305 310 315 320

Lys Leu Ser Asp Ser Gln Gln Thr Leu Phe Leu Asp Ile Val Gly Phe
325 330 335

Asp Lys Glu Gln Leu Gln Gln Gln Tyr Ser Gln Ser Pro Leu Pro Asn
340 345 350

Phe Ile Phe Thr Gly Thr Thr Thr Trp Ala Gly Gly Glu Thr Lys Glu
355 360 365

Tyr Tyr Ala Gln Gln Gln Val Asn Val Ile Asn Asn Ala Ile Asn Glu
370 375 380

Thr Ser Pro Tyr Tyr Leu Gly Lys Asp Tyr Asp Leu Phe Phe Lys Gly
385 390 395 400

His Pro Ala Gly Gly Val Ile Asn Asp Ile Ile Leu Gly Ser Phe Pro
405 410 415

Asp Met Ile Asn Ile Pro Ala Lys Ile Ser Phe Glu Val Leu Met Met
420 425 430

Thr Asp Met Leu Pro Asp Thr Val Ala Gly Ile Ala Ser Ser Leu Tyr
435 440 445

Phe Thr Ile Pro Ala Asp Lys Val Asn Phe Ile Val Phe Thr Ser Ser
450 455 460

Asp Thr Ile Thr Asp Arg Glu Glu Ala Leu Lys Ser Pro Leu Val Gln
465 470 475 480

Val Met Leu Thr Leu Gly Ile Val Lys Glu Lys Asp Val Leu Phe Trp
485 490 495

Ala Asp His Lys Val Asn Ser Met Glu Val Ala Ile Asp Glu Ala Cys
500 505 510

Thr Arg Ile Ile Ala Lys Arg Gln Pro Thr Ala Ser Asp Leu Arg Leu
515 520 525

Val Ile Ala Ile Ile Lys Thr Ile Thr Asp Leu Glu Arg Ile Gly Asp
530 535 540

Val Ala Glu Ser Ile Ala Lys Val Ala Leu Glu Ser Phe Ser Asn Lys
545 550 555 560

Gln Tyr Asn Leu Leu Val Ser Leu Glu Ser Leu Gly Gln His Thr Val
565 570 575

Arg Met Leu His Glu Val Leu Asp Ala Phe Ala Arg Met Asp Val Lys
580 585 590

Ala Ala Ile Glu Val Tyr Gln Glu Asp Asp Arg Ile Asp Gln Glu Tyr
595 600 605

Glu Ser Ile Val Arg Gln Leu Met Ala His Met Met Glu Asp Pro Ser
610 615 620

Ser Ile Pro Asn Val Met Lys Val Met Trp Ala Ala Arg Ser Ile Glu
625 630 635 640

Arg Val Gly Asp Arg Cys Gln Asn Ile Cys Glu Tyr Ile Ile Tyr Phe
645 650 655

Val Lys Gly Lys Asp Val Arg His Thr Lys Pro Asp Asp Phe Gly Thr
660 665 670

Met Leu Asp
675

<210> 65
<211> 510
<212> PRT
<213> Photobacterium damsela

<400> 65

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

Asn Ser Asp Asn Thr Ser Leu Lys Glu Thr Val Ser Ser Asn Ser Ala
20 25 30

Asp Val Val Glu Thr Glu Thr Tyr Gln Leu Thr Pro Ile Asp Ala Pro
35 40 45

Ser Ser Phe Leu Ser His Ser Trp Glu Gln Thr Cys Gly Thr Pro Ile
50 55 60

Leu Asn Glu Ser Asp Lys Gln Ala Ile Ser Phe Asp Phe Val Ala Pro
65 70 75 80

Glu Leu Lys Gln Asp Glu Lys Tyr Cys Phe Thr Phe Lys Gly Ile Thr
85 90 95

Gly Asp His Arg Tyr Ile Thr Asn Thr Thr Leu Thr Val Val Ala Pro
100 105 110

Thr Leu Glu Val Tyr Ile Asp His Ala Ser Leu Pro Ser Leu Gln Gln
115 120 125

Leu Ile His Ile Ile Gln Ala Lys Asp Glu Tyr Pro Ser Asn Gln Arg
130 135 140

Phe Val Ser Trp Lys Arg Val Thr Val Asp Ala Asp Asn Ala Asn Lys
145 150 155 160

Leu Asn Ile His Thr Tyr Pro Leu Lys Gly Asn Asn Thr Ser Pro Glu
165 170 175

Met Val Ala Ala Ile Asp Glu Tyr Ala Gln Ser Lys Asn Arg Leu Asn
180 185 190

Ile Glu Phe Tyr Thr Asn Thr Ala His Val Phe Asn Asn Leu Pro Pro
195 200 205

Ile Ile Gln Pro Leu Tyr Asn Asn Glu Lys Val Lys Ile Ser His Ile
210 215 220

Ser Leu Tyr Asp Asp Gly Ser Ser Glu Tyr Val Ser Leu Tyr Gln Trp
225 230 235 240

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

Leu Ala Asn Tyr Leu Ala Gly Thr Ser Pro Asp Ala Pro Lys Gly Met
260 265 270

Gly Asn Arg Tyr Asn Trp His Lys Leu Tyr Asp Thr Asp Tyr Tyr Phe
275 280 285

Leu Arg Glu Asp Tyr Leu Asp Val Glu Ala Asn Leu His Asp Leu Arg

290

295

300

Asp Tyr Leu Gly Ser Ser Ala Lys Gln Met Pro Trp Asp Glu Phe Ala
 305 310 315 320

Lys Leu Ser Asp Ser Gln Gln Thr Leu Phe Leu Asp Ile Val Gly Phe
 325 330 335

Asp Lys Glu Gln Leu Gln Gln Gln Tyr Ser Gln Ser Pro Leu Pro Asn
 340 345 350

Phe Ile Phe Thr Gly Thr Thr Thr Trp Ala Gly Gly Glu Thr Lys Glu
 355 360 365

Tyr Tyr Ala Gln Gln Gln Val Asn Val Ile Asn Asn Ala Ile Asn Glu
 370 375 380

Thr Ser Pro Tyr Tyr Leu Gly Lys Asp Tyr Asp Leu Phe Phe Lys Gly
 385 390 395 400

His Pro Ala Gly Gly Val Ile Asn Asp Ile Ile Leu Gly Ser Phe Pro
 405 410 415

Asp Met Ile Asn Ile Pro Ala Lys Ile Ser Phe Glu Val Leu Met Met
 420 425 430

Thr Asp Met Leu Pro Asp Thr Val Ala Gly Ile Ala Ser Ser Leu Tyr
 435 440 445

Phe Thr Ile Pro Ala Asp Lys Val Asn Phe Ile Val Phe Thr Ser Ser
 450 455 460

Asp Thr Ile Thr Asp Arg Glu Glu Ala Leu Lys Ser Pro Leu Val Gln
 465 470 475 480

Val Met Leu Thr Leu Gly Ile Val Lys Glu Lys Asp Val Leu Phe Trp
 485 490 495

Ala Asp Leu Pro Asp Cys Ser Ser Gly Val Cys Ile Asp Lys
 500 505 510

<210> 66
<211> 422
<212> PRT
<213> Heliobacter acinonychis

<400> 66

Met Gly Thr Ile Lys Lys Pro Leu Ile Ile Ala Gly Asn Gly Pro Ser
1 5 10 15

Ile Lys Asp Leu Asp Tyr Ala Leu Phe Pro Lys Asp Phe Asp Val Phe
20 25 30

Arg Cys Asn Gln Phe Tyr Phe Glu Asp Lys Tyr Tyr Leu Gly Arg Glu
35 40 45

Ile Lys Gly Val Phe Phe Asn Pro Cys Val Leu Ser Ser Gln Met Gln
50 55 60

Thr Val Gln Tyr Leu Met Asp Asn Gly Glu Tyr Ser Ile Glu Arg Phe
65 70 75 80

Phe Cys Ser Val Ser Thr Asp Arg His Asp Phe Asp Gly Asp Tyr Gln
85 90 95

Thr Ile Leu Pro Val Asp Gly Tyr Leu Lys Ala His Tyr Pro Phe Val
100 105 110

Cys Asp Thr Phe Ser Leu Phe Lys Gly His Glu Glu Ile Leu Lys His
115 120 125

Val Lys Tyr His Leu Lys Thr Tyr Ser Lys Glu Leu Ser Ala Gly Val
130 135 140

Leu Met Leu Leu Ser Ala Val Val Leu Gly Tyr Lys Glu Ile Tyr Leu
145 150 155 160

Val Gly Ile Asp Phe Gly Ala Ser Ser Trp Gly His Phe Tyr Asp Glu
165 170 175

Ser Gln Ser Gln His Phe Ser Asn His Met Ala Asp Cys His Asn Ile
180 185 190

Tyr Tyr Asp Met Leu Thr Ile Cys Leu Cys Gln Lys Tyr Ala Lys Leu
195 200 205

Tyr Ala Leu Ala Pro Asn Ser Pro Leu Ser His Leu Leu Thr Leu Asn
210 215 220

Pro Gln Ala Lys Tyr Pro Phe Glu Leu Leu Asp Lys Pro Ile Gly Tyr
225 230 235 240

Thr Ser Asp Leu Ile Ile Ser Ser Pro Leu Glu Glu Lys Leu Leu Glu
245 250 255

Phe Lys Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu
260 265 270

Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys
275 280 285

Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu Lys Leu
290 295 300

Leu Glu Phe Lys Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys Asn Ile
305 310 315 320

Glu Glu Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu Lys Leu Leu Glu
325 330 335

Phe Lys Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu
340 345 350

Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys
355 360 365

Asn Ile Glu Glu Lys Leu Leu Glu Phe Lys Asn Ile Glu Glu Lys Leu
370 375 380

Leu Ala Ser Arg Leu Asn Asn Ile Leu Arg Lys Ile Lys Arg Lys Ile
385 390 395 400

Leu Pro Phe Phe Trp Gly Gly Gly Val Thr Pro Thr Leu Lys Val Ser
405 410 415

Phe Arg Trp Gly Ala Ala
420

<210> 67

<211> 609

<212> PRT

<213> Escherichia coli

<400> 67

Met Cys Gly Ile Val Gly Ala Ile Ala Gln Arg Asp Val Ala Glu Ile
1 5 10 15

Leu Leu Glu Gly Leu Arg Arg Leu Glu Tyr Arg Gly Tyr Asp Ser Ala
20 25 30

Gly Leu Ala Val Val Asp Ala Glu Gly His Met Thr Arg Leu Arg Arg
35 40 45

Leu Gly Lys Val Gln Met Leu Ala Gln Ala Ala Glu Glu His Pro Leu
50 55 60

His Gly Gly Thr Gly Ile Ala His Thr Arg Trp Ala Thr His Gly Glu
65 70 75 80

Pro Ser Glu Val Asn Ala His Pro His Val Ser Glu His Ile Val Val
85 90 95

Val His Asn Gly Ile Ile Glu Asn His Glu Pro Leu Arg Glu Glu Leu
100 105 110

Lys Ala Arg Gly Tyr Thr Phe Val Ser Glu Thr Asp Thr Glu Val Ile
115 120 125

Ala His Leu Val Asn Trp Glu Leu Lys Gln Gly Gly Thr Leu Arg Glu
130 135 140

Ala Val Leu Arg Ala Ile Pro Gln Leu Arg Gly Ala Tyr Gly Thr Val
145 150 155 160

Ile Met Asp Ser Arg His Pro Asp Thr Leu Leu Ala Ala Arg Ser Gly
165 170 175

Ser Pro Leu Val Ile Gly Leu Gly Met Gly Glu Asn Phe Ile Ala Ser
180 185 190

Asp Gln Leu Ala Leu Leu Pro Val Thr Arg Arg Phe Ile Phe Leu Glu
195 200 205

Glu Gly Asp Ile Ala Glu Ile Thr Arg Arg Ser Val Asn Ile Phe Asp
210 215 220

Lys Thr Gly Ala Glu Val Lys Arg Gln Asp Ile Glu Ser Asn Leu Gln
225 230 235 240

Tyr Asp Ala Gly Asp Lys Gly Ile Tyr Arg His Tyr Met Gln Lys Glu
245 250 255

Ile Tyr Glu Gln Pro Asn Ala Ile Lys Asn Thr Leu Thr Gly Arg Ile
260 265 270

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

Leu Leu Ser Lys Val Glu His Ile Gln Ile Leu Ala Cys Gly Thr Ser
290 295 300

Tyr Asn Ser Gly Met Val Ser Arg Tyr Trp Phe Glu Ser Leu Ala Gly
305 310 315 320

Ile Pro Cys Asp Val Glu Ile Ala Ser Glu Phe Arg Tyr Arg Lys Ser
325 330 335

Ala Val Arg Arg Asn Ser Leu Met Ile Thr Leu Ser Gln Ser Gly Glu
340 345 350

Thr Ala Asp Thr Leu Ala Gly Leu Arg Leu Ser Lys Glu Leu Gly Tyr
355 360 365

Leu Gly Ser Leu Ala Ile Cys Asn Val Pro Gly Ser Ser Leu Val Arg

370

375

380

Glu Ser Asp Leu Ala Leu Met Thr Asn Ala Gly Thr Glu Ile Gly Val
 385 390 395 400

Ala Ser Thr Lys Ala Phe Thr Thr Gln Leu Thr Val Leu Leu Met Leu
 405 410 415

Val Ala Lys Leu Ser Arg Leu Lys Gly Leu Asp Ala Ser Ile Glu His
 420 425 430

Asp Ile Val His Gly Leu Gln Ala Leu Pro Ser Arg Ile Glu Gln Met
 435 440 445

Leu Ser Gln Asp Lys Arg Ile Glu Ala Leu Ala Glu Asp Phe Ser Asp
 450 455 460

Lys His His Ala Leu Phe Leu Gly Arg Gly Asp Gln Tyr Pro Ile Ala
 465 470 475 480

Leu Glu Gly Ala Leu Lys Leu Lys Glu Ile Ser Tyr Ile His Ala Glu
 485 490 495

Ala Tyr Ala Ala Gly Glu Leu Lys His Gly Pro Leu Ala Leu Ile Asp
 500 505 510

Ala Asp Met Pro Val Ile Val Val Ala Pro Asn Asn Glu Leu Leu Glu
 515 520 525

Lys Leu Lys Ser Asn Ile Glu Glu Val Arg Ala Arg Gly Gly Gln Leu
 530 535 540

Tyr Val Phe Ala Asp Gln Asp Ala Gly Phe Val Ser Ser Asp Asn Met
 545 550 555 560

His Ile Ile Glu Met Pro His Val Glu Glu Val Ile Ala Pro Ile Phe
 565 570 575

Tyr Thr Val Pro Leu Gln Leu Leu Ala Tyr His Val Ala Leu Ile Lys
 580 585 590

Gly	Thr	Asp	Val	Asp	Gln	Pro	Arg	Asn	Leu	Ala	Lys	Ser	Val	Thr	Val
		595					600					605			

Glu

<210> 68
 <211> 1830
 <212> DNA
 <213> Escherichia coli

<400> 68
 atgtgtggaa ttgttggcgc gatcgcgcaa cgtgatgtag cagaaatcct tcttgaaggt 60
 ttacgtcgtc tggaataaccg cggatatgac tctgccggtc tggccgttgt tgatgcagaa 120
 ggtcatatga cccgcctgcg tcgcctcggg aaagtccaga tgctggcaca ggcagcggaa 180
 gaacatcctc tgcatggcgg cactgggtatt gctcacactc gctgggacgac ccacgggtgaa 240
 ccttcagaag tgaatgcgca tccgcatgtt tctgaacaca ttgtgggtggg gcataacggc 300
 atcatcgaag accatgaacc gctgcgtgaa gagctaaaag cgctgggcta taccttcgtt 360
 tctgaaaccg acaccgaagt gattgcccac ctgggtgaact gggagctgaa acaaggcggg 420
 actctgcgtg aggccgttct gcgtgctatc ccgcagctgc gtggtgcgta cgggtacagt 480
 atcatggact cccgtcaccg ggataccctg ctggcggcac gttctggtag tccgctgggt 540
 attggcctgg ggatgggcca aaactttatc gcttctgacc agctggcgct gttgccgggt 600
 acccgtcgct ttatcttctc tgaagagggc gatattgcgg aaatcactcg ccgttcggta 660
 aacatcttcg ataaaactgg cgcggaagta aaacgtcagg atatcgaatc caatctgcaa 720
 tatgacgcgg gcgataaagg catttaccgt cactacatgc agaaagagat ctacgaacag 780
 ccgaacgcga tcaaaaacac cttaccgga cgcacagcc acggtcaggt tgatttaagc 840
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 tgtggtactt cttataactc cggatatggt tcccgtact gggttgaatc gctagcaggt 960
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tctcgcctga aaggtctgga tgcctccatt gaacatgaca tcgtgcatgg tctgcaggcg	1320
ctgccgagcc gtattgagca gatgctgtct caggacaaac gcattgaagc gctggcagaa	1380
gatttctctg acaaacatca cgcgctgttc ctgggccgtg gcgatcagta cccaatcgcg	1440
ctggaaggcg cattgaagtt gaaagagatc tcttacattc acgctgaagc ctacgctgct	1500
ggcgaaactga aacacgggcc gctggcgcta attgatgccg atatgccggt tattgttggt	1560
gcaccgaaca acgaattgct ggaaaaactg aaatccaaca ttgaagaagt tcgcgcgcgt	1620
ggcggtcagt tgtatgtctt cgccgatcag gatgcgggtt ttgtaagtag cgataacatg	1680
cacatcatcg agatgccgca tgtggaagag gtgattgcac cgatcttcta caccgttccg	1740
ctgcagctgc tggcttacca tgtcgcgctg atcaaaggca ccgacgttga ccagccgcgt	1800
aacctggcaa aatcggttac ggttgagtaa	1830

<210> 69
 <211> 609
 <212> PRT
 <213> Escherichia coli

<400> 69

Met	Cys	Gly	Ile	Val	Gly	Ala	Ile	Ala	Gln	Arg	Asp	Val	Ala	Lys	Ile
1				5					10					15	

Leu	Leu	Glu	Gly	Leu	Arg	Arg	Leu	Glu	Tyr	Arg	Gly	Tyr	Asp	Ser	Ala
			20					25					30		

Gly	Leu	Ala	Val	Val	Asp	Ala	Glu	Gly	His	Met	Thr	Arg	Leu	Arg	Arg
		35					40					45			

Leu	Gly	Lys	Val	Gln	Met	Leu	Ala	Gln	Ala	Ala	Glu	Glu	His	Pro	Leu
	50					55					60				

His	Gly	Gly	Thr	Gly	Ile	Ala	His	Thr	Arg	Trp	Ala	Thr	His	Gly	Glu
65					70				75					80	

Pro	Ser	Glu	Val	Asn	Ala	His	Pro	His	Val	Ser	Glu	His	Ile	Val	Val
				85					90					95	

Val His Asn Gly Ile Ile Glu Asn His Glu Pro Leu Arg Glu Glu Leu
100 105 110

Lys Ala Arg Gly Tyr Thr Phe Val Ser Glu Thr Asp Thr Glu Val Ile
115 120 125

Ala His Leu Val Asn Trp Glu Leu Lys Gln Gly Gly Thr Leu Arg Glu
130 135 140

Ala Val Leu Arg Ala Ile Pro Gln Leu Arg Gly Ala Tyr Gly Thr Val
145 150 155 160

Ile Met Asp Ser Arg His Pro Asp Thr Leu Leu Ala Ala Arg Ser Gly
165 170 175

Ser Pro Leu Val Ile Gly Leu Gly Met Gly Glu Asn Phe Ile Ala Ser
180 185 190

Asp Gln Leu Ala Leu Leu Pro Val Thr Arg Arg Phe Ile Phe Leu Glu
195 200 205

Glu Gly Asp Ile Ala Glu Ile Thr Arg Arg Ser Val Asn Ile Phe Asp
210 215 220

Lys Thr Gly Ala Glu Val Lys Arg Gln Asp Ile Glu Ser Asn Leu Gln
225 230 235 240

Tyr Asp Ala Gly Asp Lys Gly Ile Tyr Arg His Tyr Met Gln Lys Glu
245 250 255

Ile Tyr Glu Gln Pro Asn Ala Ile Lys Asn Thr Leu Thr Gly Arg Ile
260 265 270

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

Leu Leu Ser Lys Val Glu His Ile Gln Ile Leu Ala Cys Gly Thr Ser
290 295 300

Tyr Asn Ser Gly Met Val Ser Arg Tyr Trp Phe Glu Ser Leu Ala Gly

305		310		315		320									
Ile	Pro	Cys	Asp	Val	Glu	Ile	Ala	Ser	Glu	Phe	Arg	Tyr	Arg	Lys	Ser
				325					330					335	
Ala	Val	Arg	Arg	Asn	Ser	Leu	Met	Ile	Thr	Leu	Ser	Gln	Ser	Gly	Glu
				340				345					350		
Thr	Ala	Asp	Thr	Leu	Ala	Gly	Leu	Arg	Leu	Ser	Lys	Glu	Leu	Gly	Tyr
		355					360					365			
Leu	Gly	Ser	Leu	Ala	Ile	Cys	Asn	Val	Pro	Gly	Ser	Ser	Leu	Val	Arg
	370					375					380				
Glu	Ser	Val	Leu	Ala	Leu	Met	Thr	Asn	Ala	Gly	Thr	Glu	Ile	Gly	Val
385					390					395					400
Ala	Ser	Thr	Lys	Ala	Phe	Thr	Thr	Gln	Leu	Thr	Val	Leu	Leu	Met	Leu
				405				410						415	
Val	Ala	Lys	Leu	Ser	Arg	Leu	Lys	Gly	Leu	Asp	Ala	Ser	Ile	Glu	His
			420					425					430		
Asp	Ile	Val	His	Gly	Leu	Gln	Ala	Leu	Pro	Ser	Arg	Ile	Glu	Gln	Met
		435					440					445			
Leu	Pro	Gln	Asp	Lys	Arg	Ile	Glu	Ala	Leu	Ala	Glu	Asp	Phe	Ser	Asp
	450					455					460				
Lys	His	His	Ala	Leu	Phe	Leu	Gly	Arg	Gly	Asp	Gln	Tyr	Pro	Ile	Ala
465					470				475					480	
Leu	Glu	Gly	Ala	Leu	Lys	Leu	Lys	Glu	Ile	Ser	Tyr	Ile	His	Ala	Glu
				485				490						495	
Ala	Tyr	Ala	Ala	Gly	Glu	Leu	Lys	His	Gly	Pro	Leu	Ala	Leu	Ile	Asp
			500					505					510		
Ala	Asp	Met	Pro	Val	Ile	Val	Val	Ala	Pro	Asn	Asn	Gly	Leu	Leu	Glu
		515					520					525			

Lys Leu Lys Ser Asn Ile Glu Glu Val Arg Ala Arg Gly Gly Gln Leu
530 535 540

Tyr Val Phe Ala Asp Gln Asp Ala Gly Phe Val Ser Ser Asp Asn Met
545 550 555 560

His Ile Ile Glu Met Pro His Val Glu Glu Val Ile Ala Pro Ile Phe
565 570 575

Tyr Thr Val Pro Leu Gln Leu Leu Ala Tyr His Val Ala Leu Ile Lys
580 585 590

Gly Thr Asp Val Asp Gln Pro Arg Asn Leu Ala Lys Ser Val Thr Val
595 600 605

Glu

<210> 70
<211> 1830
<212> DNA
<213> Escherichia coli

<400> 70
atgtgcggta tcgttggtgc tatcgcacag cgtgatgtag cgaaaatcct cctggaaggt 60
ctgcgtcgtc tcgaataccg tggttacgac tctgccggtc tggcagtagt ggatgcagaa 120
ggtcacatga ctcgtctgcg tcgtctgggt aaagtgcaga tgctcgcgca ggcggcggaa 180
gaacacccac tccacggtgg tacgggtatc gcacacactc gttgggcaac ccacggtgaa 240
ccgtctgagg tcaacgcaca cccgcatgtt agcgagcaca tcgtagtcgt tcacaacggt 300
atcatcgaga accacgaacc actccgtgag gaactcaaag cccgtggtta caccttcgta 360
agcgaaaccg acacggaagt tatcgccac ctcgttaact gggaactcaa acagggtggt 420
actctgcgtg aagcagttct gcgtgccatt ccacagctgc gtggtgcata cggtaccgtg 480
atcatggact ctcgtcatcc ggataccctg ctcgccgcac gttctggttc tccactcgtt 540
atcggctctgg gtatgggtga gaacttcac gcctctgatc agctggccct gctcccagtt 600
acccgtcgct tcatcttcct ggaagagggt gacatcgccg aaatcacccg tcgttccgtt 660
aacatcttcg acaaaacggg tgcggaagtt aaacgtcagg acatcgagtc taacctgcag 720

tatgacgctg gtgacaaagg catctaccgt cactacatgc agaaagagat ctacgaacag	780
ccgaacgcga tcaaaaacac cctgaccggg cgtatctctc acggtcaggt tgacctgtct	840
gagctgggtc caaacgcgga cgaactcctg tccaaagtcg agcacatcca gacacctggct	900
tgtggtacct cttacaactc cggtatgggt tctcgttact ggttcgaatc tctggcaggt	960
atcccatgcg acgttgaaat cgcctccgaa ttccgttatc gtaaactctgc ggtacgtcgt	1020
aactccctca tgatcacctt gtctcagtct ggtgaaaccg ctgatactct ggcaggtctg	1080
cgtctcagca aagaactggg ttacctgggt tctctggcca tctgcaacgt tccgggttct	1140
agcctgggtc gtgagtctgt gctggctctg atgaccaacg cgggtacgga gatcgggtgt	1200
gcctctacca aagcgttcac taccagctc actgtcctgc tgatgctggg tgccaaactg	1260
tctcgtctca aaggcctcga cgctagcatc gaacacgaca tcgtacacgg tctgcaggcc	1320
ctcccatctc gtatcgagca gatgctgccg caggacaaac gtatcgaagc actggcagaa	1380
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ctggaagggt ccctgaaact gaaagagatc agctacatcc atgcagaggc atacgcagcg	1500
ggtgagctga aacatgggtc actggccctg atcgacgcag atatgccggt tattgtggtt	1560
gctccgaaca acggcctgct ggagaaactg aaatccaaca tcgaggaagt acgtgcgcgt	1620
ggtgggtcagc tgtacgtgtt tgctgaccag gacgcgggtt tcgtttccag cgacaacatg	1680
cacatcatcg aaatgccgca tgttgaagag gtaatcgcg ccaatcttcta caccgtaccg	1740
ctgcagctgc tggcgtacca tgtagccctg atcaaaggta cggacgttga ccagccgcgt	1800
aacctggcga aatccgtgac cgtggaataa	1830

<210> 71
 <211> 445
 <212> PRT
 <213> Escherichia coli

<400> 71

Met	Ser	Asn	Arg	Lys	Tyr	Phe	Gly	Thr	Asp	Gly	Ile	Arg	Gly	Arg	Val
1				5					10					15	

Gly	Asp	Ala	Pro	Ile	Thr	Pro	Asp	Phe	Val	Leu	Lys	Leu	Gly	Trp	Ala
			20					25					30		

Ala Gly Lys Val Leu Ala Arg His Gly Ser Arg Lys Ile Ile Ile Gly
35 40 45

Lys Asp Thr Arg Ile Ser Gly Tyr Met Leu Glu Ser Ala Leu Glu Ala
50 55 60

Gly Leu Ala Ala Ala Gly Leu Ser Ala Leu Phe Thr Gly Pro Met Pro
65 70 75 80

Thr Pro Ala Val Ala Tyr Leu Thr Arg Thr Phe Arg Ala Glu Ala Gly
85 90 95

Ile Val Ile Ser Ala Ser His Asn Pro Phe Tyr Asp Asn Gly Ile Lys
100 105 110

Phe Phe Ser Ile Asp Gly Thr Lys Leu Pro Asp Ala Val Glu Glu Ala
115 120 125

Ile Glu Ala Glu Met Glu Lys Glu Ile Ser Cys Val Asp Ser Ala Glu
130 135 140

Leu Gly Lys Ala Ser Arg Ile Val Asp Ala Ala Gly Arg Tyr Ile Glu
145 150 155 160

Phe Cys Lys Ala Thr Phe Pro Asn Glu Leu Ser Leu Ser Glu Leu Lys
165 170 175

Ile Val Val Asp Cys Ala Asn Gly Ala Thr Tyr His Ile Ala Pro Asn
180 185 190

Val Leu Arg Glu Leu Gly Ala Asn Val Ile Ala Ile Gly Cys Glu Pro
195 200 205

Asn Gly Val Asn Ile Asn Ala Glu Val Gly Ala Thr Asp Val Arg Ala
210 215 220

Leu Gln Ala Arg Val Leu Ala Glu Lys Ala Asp Leu Gly Ile Ala Phe
225 230 235 240

Asp Gly Asp Gly Asp Arg Val Ile Met Val Asp His Glu Gly Asn Lys

245

250

255

Val Asp Gly Asp Gln Ile Met Tyr Ile Ile Ala Arg Glu Gly Leu Arg
 260 265 270

Gln Gly Gln Leu Arg Gly Gly Ala Val Gly Thr Leu Met Ser Asn Met
 275 280 285

Gly Leu Glu Leu Ala Leu Lys Gln Leu Gly Ile Pro Phe Ala Arg Ala
 290 295 300

Lys Val Gly Asp Arg Tyr Val Leu Glu Lys Met Gln Glu Lys Gly Trp
 305 310 315 320

Arg Ile Gly Ala Glu Asn Ser Gly His Val Ile Leu Leu Asp Lys Thr
 325 330 335

Thr Thr Gly Asp Gly Ile Val Ala Gly Leu Gln Val Leu Ala Ala Met
 340 345 350

Ala Arg Asn His Met Ser Leu His Asp Leu Cys Ser Gly Met Lys Met
 355 360 365

Phe Pro Gln Ile Leu Val Asn Val Arg Tyr Thr Ala Gly Ser Gly Asp
 370 375 380

Pro Leu Glu His Glu Ser Val Lys Ala Val Thr Ala Glu Val Glu Ala
 385 390 395 400

Ala Leu Gly Asn Arg Gly Arg Val Leu Leu Arg Lys Ser Gly Thr Glu
 405 410 415

Pro Leu Ile Arg Val Met Val Glu Gly Glu Asp Glu Ala Gln Val Thr
 420 425 430

Glu Phe Ala His Arg Ile Ala Asp Ala Val Lys Ala Val
 435 440 445

<210> 72

<211> 1338

<212> DNA

<213> Escherichia coli

<400> 72

atgagtaatc gtaaataatc cggtaccgat gggattcgtg gtcgtgtagg ggatgcgccg	60
atcacacctg attttgtgct taagctgggt tgggccgcgg gtaaagtgct ggcgcgccac	120
ggctcccgta agattattat tggtaaagac acgcgtatct ctggctatat gctggagtca	180
gcactggaag cgggtctggc ggcagcgggc ctttccgcac tcttactgg cccgatgcca	240
acaccggccg tggcttatct gacgcgtacc ttccgcgcag aggccggaat tgtgatctct	300
gcatcgcata acccgttcta cgataatggc attaaattct tctctatcga cggcaccaaa	360
ctgccggatg cggtagaaga ggccatcgaa gcggaaatgg aaaaggagat cagctgcgtt	420
gattcggcag aactgggtaa agccagccgt atcgttgatg ccgcgggtcg ctatatcgag	480
ttttgcaaag ccacgttccc gaacgaactt agcctcagtg aactgaagat tgtggtggat	540
tgtgcaaacg gtgcgactta tcacatcgcg ccgaacgtgc tgcgcgaact gggggcgaac	600
gttatcgcta tcggttgatg gccaaacggg gtaaacaatca atgccgaagt gggggctacc	660
gacgttcgcg cgctccaggc tcgtgtgctg gctgaaaaag cggatctcgg tattgccttc	720
gacggcgatg gcgatcgctg gattatgggt gaccatgaag gcaataaagt cgatggcgat	780
cagatcatgt atatcatcgc gcgtgaaggc cttcgtcagg gccagctgcg tgggtggcgct	840
gtgggtacat tgatgagcaa catggggctt gaactggcgc tgaaacagtt aggaattcca	900
tttgcgcgcg cgaaagtggg tgaccgctac gtactggaaa aaatgcagga gaaaggctgg	960
cgtatcggtg cagagaattc cggatcatgt atcctgctgg ataaaactac taccggtgac	1020
ggcatcggtg ctggcttgca ggtgctggcg gcgatggcac gtaaccatat gagcctgcac	1080
gacctttgca gcggcatgaa aatgttcccg cagattctgg ttaacgtacg ttacaccgca	1140
ggtagcggcg atccacttga gcatgagtca gttaaagccg tgaccgcaga ggttgaagct	1200
gcgctgggca accgtggacg cgtgttgctg cgtaaattcc gcaccgaacc gtttaattcg	1260
gtgatgggtg aaggcgaaga cgaagcgag gtgactgaat ttgcacaccg catcgccgat	1320
gcagtaaaag ccgtttta	1338

<210> 73

<211> 456

<212> PRT

<213> Escherichia coli

<400> 73

Met Leu Asn Asn Ala Met Ser Val Val Ile Leu Ala Ala Gly Lys Gly
1 5 10 15

Thr Arg Met Tyr Ser Asp Leu Pro Lys Val Leu His Thr Leu Ala Gly
20 25 30

Lys Ala Met Val Gln His Val Ile Asp Ala Ala Asn Glu Leu Gly Ala
35 40 45

Ala His Val His Leu Val Tyr Gly His Gly Gly Asp Leu Leu Lys Gln
50 55 60

Ala Leu Lys Asp Asp Asn Leu Asn Trp Val Leu Gln Ala Glu Gln Leu
65 70 75 80

Gly Thr Gly His Ala Met Gln Gln Ala Ala Pro Phe Phe Ala Asp Asp
85 90 95

Glu Asp Ile Leu Met Leu Tyr Gly Asp Val Pro Leu Ile Ser Val Glu
100 105 110

Thr Leu Gln Arg Leu Arg Asp Ala Lys Pro Gln Gly Gly Ile Gly Leu
115 120 125

Leu Thr Val Lys Leu Asp Asp Pro Thr Gly Tyr Gly Arg Ile Thr Arg
130 135 140

Glu Asn Gly Lys Val Thr Gly Ile Val Glu His Lys Asp Ala Thr Asp
145 150 155 160

Glu Gln Arg Gln Ile Gln Glu Ile Asn Thr Gly Ile Leu Ile Ala Asn
165 170 175

Gly Ala Asp Met Lys Arg Trp Leu Ala Lys Leu Thr Asn Asn Asn Ala
180 185 190

Gln Gly Glu Tyr Tyr Ile Thr Asp Ile Ile Ala Leu Ala Tyr Gln Glu
195 200 205

Gly Arg Glu Ile Val Ala Val His Pro Gln Arg Leu Ser Glu Val Glu
210 215 220

Gly Val Asn Asn Arg Leu Gln Leu Ser Arg Leu Glu Arg Val Tyr Gln
225 230 235 240

Ser Glu Gln Ala Glu Lys Leu Leu Leu Ala Gly Val Met Leu Arg Asp
245 250 255

Pro Ala Arg Phe Asp Leu Arg Gly Thr Leu Thr His Gly Arg Asp Val
260 265 270

Glu Ile Asp Thr Asn Val Ile Ile Glu Gly Asn Val Thr Leu Gly His
275 280 285

Arg Val Lys Ile Gly Thr Gly Cys Val Ile Lys Asn Ser Val Ile Gly
290 295 300

Asp Asp Cys Glu Ile Ser Pro Tyr Thr Val Val Glu Asp Ala Asn Leu
305 310 315 320

Ala Ala Ala Cys Thr Ile Gly Pro Phe Ala Arg Leu Arg Pro Gly Ala
325 330 335

Glu Leu Leu Glu Gly Ala His Val Gly Asn Phe Val Glu Met Lys Lys
340 345 350

Ala Arg Leu Gly Lys Gly Ser Lys Ala Gly His Leu Thr Tyr Leu Gly
355 360 365

Asp Ala Glu Ile Gly Asp Asn Val Asn Ile Gly Ala Gly Thr Ile Thr
370 375 380

Cys Asn Tyr Asp Gly Ala Asn Lys Phe Lys Thr Ile Ile Gly Asp Asp
385 390 395 400

Val Phe Val Gly Ser Asp Thr Gln Leu Val Ala Pro Val Thr Val Gly
405 410 415

Lys Gly Ala Thr Ile Ala Ala Gly Thr Thr Val Thr Arg Asn Val Gly

420

425

430

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

Trp Arg Arg Pro Val Lys Lys Lys
 450 455

<210> 74

<211> 1371

<212> DNA

<213> Escherichia coli

<400> 74

atgttgaata atgctatgag cgtagtgatc cttgccgcag gcaaaggcac gcgcatgtat	60
tccgatcttc cgaaagtgct gcataccctt gccgggaaag cgatgggttca gcatgtcatt	120
gatgctgcga atgaattagg cgcagcgcac gttcacctgg tgtacgggtca cggcggcgat	180
ctgctaaaac aggcgctgaa agacgacaac cttactggg tgcttcaggc agagcagctg	240
ggtaggggtc atgcaatgca gcaggccgca cttttctttg ccgatgatga agacatttta	300
atgctctacg gcgacgtgcc gctgatctct gtcgaaacac tccagcgtct gcgtgatgct	360
aaaccgcagg gtggcattgg tctgctgacg gtgaaactgg atgatccgac cggttatgga	420
cgtatcaccg gtgaaaacgg caaagttacc ggcattgttg agcacaaaga tgccaccgac	480
gagcagcgtc agattcagga gatcaacacc ggcattctga ttgccaacgg cgcagatatg	540
aaacgctggc tggcgaagct gaccaacaat aatgctcagg gcgaatacta catcaccgac	600
attattgcgc tggcgtatca ggaagggcgt gaaatcgtcg ccgttcattc gcaacgttta	660
agcgaagtag aaggcgtgaa taaccgcctg caactctccc gtctggagcg tgtttatcag	720
tccgaacagg ctgaaaaact gctgttagca ggcgttatgc tgcgcgatcc agcgcgtttt	780
gatctgcgtg gtacgctaac tcacgggcgc gatgttgaaa ttgatactaa cgttatcatc	840
gagggcaacg tgactctcgg tcatcgcgtg aaaattggca ccggttgctg gattaaaaac	900
agcgtgattg gcgatgattg cgaaatcagt ccgtataccg ttgtggaaga tgcgaatctg	960
gcagcggcct gtaccattgg cccgtttgcc cgtttgcgtc ctggtgctga gttgctggaa	1020
ggtgctcacg tcggtaactt cgttgagatg aaaaaagcgc gtctgggtaa aggctcgaaa	1080
gctggtcatt tgacttacct gggcgatgcg gaaattggcg ataacgttaa catcggcgcg	1140

ggaaccatta cctgcaacta cgatggtgcg aataaattta agaccattat cggcgcacgat 1200
 gtgtttgttg gttccgacac tcagctggtg gccccggtaa cagtaggcaa aggcgcgacc 1260
 attgctgcgg gtacaactgt gacgcgtaat gtcggcgaaa atgcattagc tadcagccgt 1320
 gtgccgcaga ctcaaaaaga aggctggcgt cgtccggtaa agaaaaagtg a 1371

<210> 75
 <211> 391
 <212> PRT
 <213> Escherichia coli

<400> 75

Met Lys Lys Ile Leu Tyr Val Thr Gly Ser Arg Ala Glu Tyr Gly Ile
 1 5 10 15

Val Arg Arg Leu Leu Thr Met Leu Arg Glu Thr Pro Glu Ile Gln Leu
 20 25 30

Asp Leu Ala Val Thr Gly Met His Cys Asp Asn Ala Tyr Gly Asn Thr
 35 40 45

Ile His Ile Ile Glu Gln Asp Asn Phe Asn Ile Ile Lys Val Val Asp
 50 55 60

Ile Asn Ile Asn Thr Thr Ser His Thr His Ile Leu His Ser Met Ser
 65 70 75 80

Val Cys Leu Asn Ser Phe Gly Asp Phe Phe Ser Asn Asn Thr Tyr Asp
 85 90 95

Ala Val Met Val Leu Gly Asp Arg Tyr Glu Ile Phe Ser Val Ala Ile
 100 105 110

Ala Ala Ser Met His Asn Ile Pro Leu Ile His Ile His Gly Gly Glu
 115 120 125

Lys Thr Leu Ala Asn Tyr Asp Glu Phe Ile Arg His Ser Ile Thr Lys
 130 135 140

Met Ser Lys Leu His Leu Thr Ser Thr Glu Glu Tyr Lys Lys Arg Val

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

Phe Ile Lys Ser Lys Asn Lys Asp Tyr Lys Asp Phe Tyr Asp Ile Pro
 370 375 380

Glu Cys Thr Thr Ser Tyr Asp
 385 390

<210> 76
 <211> 1176
 <212> DNA
 <213> Escherichia coli

<400> 76
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 ttgacaatgc taagagaaac tccagaaata cagcttgatt tggcagttac aggaatgcat 120
 tgtgataatg cgtatggaaa tacaatacat attatagaac aagataattt taatattatc 180
 aaggttgtgg atataaatat caatacaact tcacatactc acattctcca ttcaatgagt 240
 gtttgcctca attcgtttgg tgattttttt tcaaataaca catatgatgc ggttatggtt 300
 ttaggcgata gatatgaaat attttcagtc gctatcgag catcaatgca taatattcca 360
 ttaattcata ttcattgggtg tgaaaagaca ttagctaatt atgatgagtt tattaggcat 420
 tcaattacta aaatgagtaa actccatctt acttctacag aagagtataa aaaacgagta 480
 attcaactag gtgaaaagcc tggtagtgtg tttaatattg gttctcttgg tgcagaaaat 540
 gctctttcat tgcatttacc aaataagcag gagttggaac taaaatatgg ttcactgtta 600
 aaacgggtact ttgtttagt attccatcct gaaacacttt ccacgcagtc ggttaatgat 660
 caaatagatg agttattgtc agcgatttct ttttttaaaa atactcacga ctttattttt 720
 attggcagta acgctgacac tggttctgat ataattcaga gaaaagtaaa atatTTTTgc 780
 aaagagtata agttcagata tttgatttct attcgttcag aagattattt ggcaatgatt 840
 aaatactctt gtgggctaatt tgggaactcc tcctctgggt taattgaggt tccatcttta 900
 aaagttgcaa caattaacat tggatgatagg cagaaaggcc gtgttcgtgg agccagtgt 960
 atagatgtac ccgttgaaaa aaatgcaatc gtcagaggga taaatatatc tcaagatgaa 1020
 aaatttatta gtgttgatc gtcatttagt aatccttatt ttaaagaaaa tgctttaatt 1080
 aatgctgtta gaattattaa ggattttatt aaatcaaaaa ataaagatta caaagatttt 1140
 tatgacatcc cggaatgtac caccagttat gactag 1176

<210> 77
<211> 159
<212> PRT
<213> *Saccharomyces cerevisiae*

<400> 77

Met Ser Leu Pro Asp Gly Phe Tyr Ile Arg Arg Met Glu Glu Gly Asp
1 5 10 15

Leu Glu Gln Val Thr Glu Thr Leu Lys Val Leu Thr Thr Val Gly Thr
20 25 30

Ile Thr Pro Glu Ser Phe Ser Lys Leu Ile Lys Tyr Trp Asn Glu Ala
35 40 45

Thr Val Trp Asn Asp Asn Glu Asp Lys Lys Ile Met Gln Tyr Asn Pro
50 55 60

Met Val Ile Val Asp Lys Arg Thr Glu Thr Val Ala Ala Thr Gly Asn
65 70 75 80

Ile Ile Ile Glu Arg Lys Ile Ile His Glu Leu Gly Leu Cys Gly His
85 90 95

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

Lys Leu Leu Ile Asp Gln Leu Val Thr Ile Gly Phe Asp Tyr Gly Cys
115 120 125

Tyr Lys Ile Ile Leu Asp Cys Asp Glu Lys Asn Val Lys Phe Tyr Glu
130 135 140

Lys Cys Gly Phe Ser Asn Ala Gly Val Glu Met Gln Ile Arg Lys
145 150 155

<210> 78
<211> 480
<212> DNA
<213> *Saccharomyces cerevisiae*

<400> 78
atgagcttac cccgatggatt ttatataagg cgaatggaag agggggattt ggaacaggtc 60
actgagacgc taaaggtttt gaccaccgtg ggcactatta cccccgaatc cttcagcaaa 120
ctcataaaaat actggaatga agccacagta tggaatgata acgaagataa aaaaataatg 180
caatataacc ccatggtgat tgtggacaag cgcaccgaga cggttgccgc tacggggaat 240
atcatcatcg aaagaaagat cattcatgaa ctggggctat gtggccacat cgaggacatt 300
gcagtaaact ccaagtatca gggccaaggt ttgggcaagc tcttgattga tcaattggta 360
actatcggct ttgactacgg ttgttataag attatttttag attgcgatga gaaaaatgtc 420
aaattctatg aaaaatgtgg gtttagcaac gcaggcgtgg aaatgcaaat tagaaaatag 480

<210> 79
<211> 188
<212> PRT
<213> Escherichia coli

<400> 79

Met Tyr Glu Arg Tyr Ala Gly Leu Ile Phe Asp Met Asp Gly Thr Ile
1 5 10 15

Leu Asp Thr Glu Pro Thr His Arg Lys Ala Trp Arg Glu Val Leu Gly
20 25 30

His Tyr Gly Leu Gln Tyr Asp Ile Gln Ala Met Ile Ala Leu Asn Gly
35 40 45

Ser Pro Thr Trp Arg Ile Ala Gln Ala Ile Ile Glu Leu Asn Gln Ala
50 55 60

Asp Leu Asp Pro His Ala Leu Ala Arg Glu Lys Thr Glu Ala Val Arg
65 70 75 80

Ser Met Leu Leu Asp Ser Val Glu Pro Leu Pro Leu Val Asp Val Val
85 90 95

Lys Ser Trp His Gly Arg Arg Pro Met Ala Val Gly Thr Gly Ser Glu
100 105 110

Ser Ala Ile Ala Glu Ala Leu Leu Ala His Leu Gly Leu Arg His Tyr

115

120

125

Phe Asp Ala Val Val Ala Ala Asp His Val Lys His His Lys Pro Ala
 130 135 140

Pro Asp Thr Phe Leu Leu Cys Ala Gln Arg Met Gly Val Gln Pro Thr
 145 150 155 160

Gln Cys Val Val Phe Glu Asp Ala Asp Phe Gly Ile Gln Ala Ala Arg
 165 170 175

Ala Ala Gly Met Asp Ala Val Asp Val Arg Leu Leu
 180 185

<210> 80

<211> 199

<212> PRT

<213> Escherichia coli

<400> 80

Met Leu Tyr Ile Phe Asp Leu Gly Asn Val Ile Val Asp Ile Asp Phe
 1 5 10 15

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

Ser Leu Lys Lys Ser Phe His Met Gly Glu Ala Phe His Gln His Glu
 35 40 45

Arg Gly Glu Ile Ser Asp Glu Ala Phe Ala Glu Ala Leu Cys His Glu
 50 55 60

Met Ala Leu Pro Leu Ser Tyr Glu Gln Phe Ser His Gly Trp Gln Ala
 65 70 75 80

Val Phe Val Ala Leu Arg Pro Glu Val Ile Ala Ile Met His Lys Leu
 85 90 95

Arg Glu Gln Gly His Arg Val Val Val Leu Ser Asn Thr Asn Arg Leu
 100 105 110

His Thr Thr Phe Trp Pro Glu Glu Tyr Pro Glu Ile Arg Asp Ala Ala
 115 120 125

Asp His Ile Tyr Leu Ser Gln Asp Leu Gly Met Arg Lys Pro Glu Ala
 130 135 140

Arg Ile Tyr Gln His Val Leu Gln Ala Glu Gly Phe Ser Pro Ser Asp
 145 150 155 160

Thr Val Phe Phe Asp Asp Asn Ala Asp Asn Ile Glu Gly Ala Asn Gln
 165 170 175

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

Tyr Phe Ala Lys Val Leu Cys
 195

<210> 81
 <211> 567
 <212> DNA
 <213> Escherichia coli

<400> 81
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 cctacgcacc gtaaagcgtg gcgcgaagta ttagggcact acggtcttca gtacgatatt 120
 caggcgatga ttgcgcttaa tggatcgccc acctggcgta ttgctcaggc aattattgag 180
 ctgaatcagg ccgatctcga cccgcatgcg ttagcgcgtg aaaaaacaga agcagtaaga 240
 agtatgctgc tggatagcgt cgaaccgctt cctcttggtg atgtggtgaa aagttggcat 300
 ggtcgtcgcc caatggctgt aggaacgggg agtgaaagcg ccatcgctga ggcattgctg 360
 gcgcacctgg gattacgcca ttattttgac gccgtcgtcg ctgccgatca cgtcaaacac 420
 cataaaccgg cgccagacac atttttggtg tgcgcgcagc gtatgggcgt gcaaccgacg 480
 cagtgtgtgg tctttgaaga tgccgatttc ggtattcagg cggcccgtgc agcaggcatg 540
 gacgccgtgg atgttcgctt gctgtga 567

<210> 82
 <211> 600
 <212> DNA

<213> Escherichia coli

<400> 82

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ggagcctgga gcgatttaac gcgtattccg ctggcatcgc ttaagaagag ttttcatatg      120
ggggaggcgt ttcatacagca tgagcgtggg gaaattagcg acgaagcggt cgcagaggcg      180
ctgtgtcatg agatggctct accgctaagc tacgagcagt tctctcacgg ctggcaggcg      240
gtgtttgttg cgctgcgccc ggaagtgatc gccatcatgc ataaactgcg tgagcagggg      300
catcgcgtgg tgggtgcttc caataccaac cgcctgcata ccaccttctg gccggaagaa      360
taccgggaaa ttcgtgatgc tgctgaccat atctatctgt cgcaagatct ggggatgcgc      420
aaacctgaag cacgaattta ccagcatgtt ttgcaggcgg aagggtttttc acccagcgat      480
acgggtctttt tcgacgataa cgccgataat atagaaggag ccaatcagct gggcattacc      540
agtattctgg tgaaagataa aaccaccatc ccggactatt tcgcgaaggt gttatgctaa      600
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<210> 83

<211> 421

<212> PRT

<213> Bacteroides ovatus

<400> 83

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Met Asp Ser Lys Asn Asn Ile Gly His Ser Ala Asp Ile Ser Leu Thr
1          5          10          15
```

```
Ala Glu Leu Pro Ile Pro Ile Tyr Asn Gly Asn Thr Ile Met Asp Phe
          20          25          30
```

```
Lys Lys Leu Ala Ser Leu Tyr Lys Asp Glu Leu Leu Asp Asn Val Leu
          35          40          45
```

```
Pro Phe Trp Leu Glu His Ser Gln Asp His Glu Tyr Gly Gly Tyr Phe
          50          55          60
```

```
Thr Cys Leu Asp Arg Glu Gly Lys Val Phe Asp Thr Asp Lys Phe Ile
65          70          75          80
```

```
Trp Leu Gln Ser Arg Glu Val Trp Met Phe Ser Met Leu Tyr Asn Lys
          85          90          95
```

Val Glu Lys Arg Gln Glu Trp Leu Asp Cys Ala Ile Gln Gly Gly Glu
100 105 110

Phe Leu Lys Lys Tyr Gly His Asp Gly Asn Tyr Asn Trp Tyr Phe Ser
115 120 125

Leu Asp Arg Ser Gly Arg Pro Leu Val Glu Pro Tyr Asn Ile Phe Ser
130 135 140

Tyr Thr Phe Ala Thr Met Ala Phe Gly Gln Leu Ser Leu Thr Thr Gly
145 150 155 160

Asn Gln Glu Tyr Ala Asp Ile Ala Lys Lys Thr Phe Asp Ile Ile Leu
165 170 175

Ser Lys Val Asp Asn Pro Lys Gly Arg Trp Asn Lys Leu His Pro Gly
180 185 190

Thr Arg Asn Leu Lys Asn Phe Ala Leu Pro Met Ile Leu Cys Asn Leu
195 200 205

Ala Leu Glu Ile Glu His Leu Leu Asp Glu Thr Tyr Leu Arg Glu Thr
210 215 220

Met Asp Thr Cys Ile His Glu Val Met Glu Val Phe Tyr Arg Pro Glu
225 230 235 240

Leu Gly Gly Ile Ile Val Glu Asn Val Asp Ile Asp Gly Asn Leu Val
245 250 255

Asp Cys Phe Glu Gly Arg Gln Val Thr Pro Gly His Ala Ile Glu Ala
260 265 270

Met Trp Phe Ile Met Asp Leu Gly Lys Arg Leu Asn Arg Pro Glu Leu
275 280 285

Ile Glu Lys Ala Lys Glu Thr Thr Leu Thr Met Leu Asn Tyr Gly Trp
290 295 300

Asp Lys Gln Tyr Gly Gly Ile Tyr Tyr Phe Met Asp Arg Asn Gly Cys

305 310 315 320

Pro Pro Gln Gln Leu Glu Trp Asp Gln Lys Leu Trp Trp Val His Ile
325 330 335

Glu Thr Leu Ile Ser Leu Leu Lys Gly Tyr Gln Leu Thr Gly Asp Lys
340 345 350

Lys Cys Leu Glu Trp Phe Glu Lys Val His Asp Tyr Thr Trp Glu His
355 360 365

Phe Lys Asp Lys Glu Tyr Pro Glu Trp Tyr Gly Tyr Leu Asn Arg Arg
370 375 380

Gly Glu Val Leu Leu Pro Leu Lys Gly Gly Lys Trp Lys Gly Cys Phe
385 390 395 400

His Val Pro Arg Gly Leu Tyr Gln Cys Trp Lys Thr Leu Glu Glu Ile
405 410 415

Lys Asn Ile Val Ser
420

<210> 84
<211> 391
<212> PRT
<213> Synechocystis sp.

<400> 84

Met Ile Ala His Arg Arg Gln Glu Leu Ala Gln Gln Tyr Tyr Gln Ala
1 5 10 15

Leu His Gln Asp Val Leu Pro Phe Trp Glu Lys Tyr Ser Leu Asp Arg
20 25 30

Gln Gly Gly Gly Tyr Phe Thr Cys Leu Asp Arg Lys Gly Gln Val Phe
35 40 45

Asp Thr Asp Lys Phe Ile Trp Leu Gln Asn Arg Gln Val Trp Gln Phe
50 55 60

Ala Val Phe Tyr Asn Arg Leu Glu Pro Lys Pro Gln Trp Leu Glu Ile
65 70 75 80

Ala Arg His Gly Ala Asp Phe Leu Ala Arg His Gly Arg Asp Gln Asp
85 90 95

Gly Asn Trp Tyr Phe Ala Leu Asp Gln Glu Gly Lys Pro Leu Arg Gln
100 105 110

Pro Tyr Asn Val Phe Ser Asp Cys Phe Ala Ala Met Ala Phe Ser Gln
115 120 125

Tyr Ala Leu Ala Ser Gly Ala Gln Glu Ala Lys Ala Ile Ala Leu Gln
130 135 140

Ala Tyr Asn Asn Val Leu Arg Arg Gln His Asn Pro Lys Gly Gln Tyr
145 150 155 160

Glu Lys Ser Tyr Pro Gly Thr Arg Pro Leu Lys Ser Leu Ala Val Pro
165 170 175

Met Ile Leu Ala Asn Leu Thr Leu Glu Met Glu Trp Leu Leu Pro Pro
180 185 190

Thr Thr Val Glu Glu Val Leu Ala Gln Thr Val Arg Glu Val Met Thr
195 200 205

Asp Phe Leu Asp Pro Glu Ile Gly Leu Met Arg Glu Ala Val Thr Pro
210 215 220

Thr Gly Glu Phe Val Asp Ser Phe Glu Gly Arg Leu Leu Asn Pro Gly
225 230 235 240

His Gly Ile Glu Ala Met Trp Phe Met Met Asp Ile Ala Gln Arg Ser
245 250 255

Gly Asp Arg Gln Leu Gln Glu Gln Ala Ile Ala Val Val Leu Asn Thr
260 265 270

Leu Glu Tyr Ala Trp Asp Glu Glu Phe Gly Gly Ile Phe Tyr Phe Leu
275 280 285

Asp Arg Gln Gly His Pro Pro Gln Gln Leu Glu Trp Asp Gln Lys Leu
290 295 300

Trp Trp Val His Leu Glu Thr Leu Val Ala Leu Ala Lys Gly His Gln
305 310 315 320

Ala Thr Gly Gln Glu Lys Cys Trp Gln Trp Phe Glu Arg Val His Asp
325 330 335

Tyr Ala Trp Ser His Phe Ala Asp Pro Glu Tyr Gly Glu Trp Phe Gly
340 345 350

Tyr Leu Asn Arg Arg Gly Glu Val Leu Leu Asn Leu Lys Gly Gly Lys
355 360 365

Trp Lys Gly Cys Phe His Val Pro Arg Ala Leu Trp Leu Cys Ala Glu
370 375 380

Thr Leu Gln Leu Pro Val Ser
385 390

<210> 85
<211> 1266
<212> DNA
<213> Bacteroides ovatus

<400> 85
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gatgagctcc tggacaacgt ccttcctttc tggcttgaac attcacaaga ccatgagtat 180
ggtggttact tcacctgtct ggaccgtgaa ggaaaagtat tcgatacgga taagtttatt 240
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aatatattct cgtatacatt cgctaccatg gctttcggac agttgagcct tacaaccggt 480
aatcaggaat atgcggacat tgccaagaaa actttcgata taatcctttc caaagtggat 540

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ctgcgggaaa caatggatac ttgtatccat gaagtgatgg aagttttcta tcgtcctgaa	720
ctcggaggta tcattgttga aaacgtggac atagacggta atttggtcga ttgttttgaa	780
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aagcgtctga atcgtccgga attgatagag aaagccaaag agactactct cacgatgctt	900
aattatggct gggacaagca atatggaggt atctactatt ttatggatcg taacggttgt	960
cctccccaac aattggagtg ggaccagaaa ctctgggtggg tccatatcga aacgcttatt	1020
tccctgctga aaggctatca attgacggga gacaaaaaat gcttggaatg gtttgaaaag	1080
gtacatgact acacttggga gcatttcaag gataaagaat atcctgaatg gtatggctac	1140
ttgaaccgaa gaggcgaagt attgctacca ctcaaaggag gaaaatggaa aggatgcttc	1200
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tcctaa	1266

<210> 86
 <211> 1176
 <212> DNA
 <213> Synechocystis sp.

<400> 86	
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ttagaccgta aaggccaggt ttttgacaca gataaattca tttggttaca aaaccgtcag	180
gtatggcagt ttgccgtttt ctacaaccgt ttggaaccaa aaccccaatg gttagaaatt	240
gcccgccatg gtgctgattt tttagctcgc cacggccgag atcaagacgg taattggtat	300
tttgctttgg atcaggaagg caaaccctg cgtcaaccct ataacgtttt ttccgattgc	360
ttcgccgcca tggccttttag tcaatatgcc ttagccagtg gggcgcagga agctaaagcc	420
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gagaagtcct atccaggtac tagaccctc aaatccctgg cggtgccgat gattttagcc	540
aacctcacc tggagatgga atggttatta ccgcctacta ccgtggaaga ggtgttggcc	600
caaaccgtca gagaagtgat gacggatttc ctcgaccag aaataggatt aatgcgggaa	660

gcggtgaccc ccacaggaga atttgttgat agttttgaag ggcggttgct caacccagga	720
cacggcattg aagccatgtg gttcatgatg gacattgccc aacgctccgg cgatcgccag	780
ttacaggagc aagccattgc agtgggtgttg aacaccctgg aatatgcctg ggatgaagaa	840
tttgggtggca tattttatatt ccttgatcgc cagggccacc ctccccaaca actggaatgg	900
gacaaaaagc tctggtgggt acatttgga accctggttg ccctagccaa gggccaccaa	960
gccactggcc aagaaaaatg ttggcaatgg tttgagcggg tccatgatta cgcctggagt	1020
catttcgccg atcctgagta tggggaatgg tttggctacc tgaatcgccg gggagaggtg	1080
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<210> 87
 <211> 229
 <212> PRT
 <213> Escherichia coli

<400> 87

Met	Ser	Leu	Leu	Ala	Gln	Leu	Asp	Gln	Lys	Ile	Ala	Ala	Asn	Gly	Gly
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Leu	Ile	Val	Ser	Cys	Gln	Pro	Val	Pro	Asp	Ser	Pro	Leu	Asp	Lys	Pro
			20					25					30		

Glu	Ile	Val	Ala	Ala	Met	Ala	Leu	Ala	Ala	Glu	Gln	Ala	Gly	Ala	Val
		35					40					45			

Ala	Ile	Arg	Ile	Glu	Gly	Val	Ala	Asn	Leu	Gln	Ala	Thr	Arg	Ala	Val
	50					55					60				

Val	Ser	Val	Pro	Ile	Ile	Gly	Ile	Val	Lys	Arg	Asp	Leu	Glu	Asp	Ser
65				70					75					80	

Pro	Val	Arg	Ile	Thr	Ala	Tyr	Ile	Glu	Asp	Val	Asp	Ala	Leu	Ala	Gln
			85					90						95	

Ala	Gly	Ala	Asp	Ile	Ile	Ala	Ile	Asp	Gly	Thr	Asp	Arg	Pro	Arg	Pro
			100					105					110		

Val Pro Val Glu Thr Leu Leu Ala Arg Ile His His His Gly Leu Leu
115 120 125

Ala Met Thr Asp Cys Ser Thr Pro Glu Asp Gly Leu Ala Cys Gln Lys
130 135 140

Leu Gly Ala Glu Ile Ile Gly Thr Thr Leu Ser Gly Tyr Thr Thr Pro
145 150 155 160

Glu Thr Pro Glu Glu Pro Asp Leu Ala Leu Val Lys Thr Leu Ser Asp
165 170 175

Ala Gly Cys Arg Val Ile Ala Glu Gly Arg Tyr Asn Thr Pro Ala Gln
180 185 190

Ala Ala Asp Ala Met Arg His Gly Ala Trp Ala Val Thr Val Gly Ser
195 200 205

Ala Ile Thr Arg Leu Glu His Ile Cys Gln Trp Tyr Asn Thr Ala Met
210 215 220

Lys Lys Ala Val Leu
225

<210> 88
<211> 690
<212> DNA
<213> Escherichia coli

<400> 88
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gcggcagaac aggcgggagc ggttgccatt cgcattgaag gtgtggcaaa tctgcaagcc 180
acgcgtgcgg tggtagcgt gccgattatt ggaattgtga aacgcgatct ggaggattct 240
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cgtattcacc atcacggttt actggcgatg accgactgct caacgccgga agacggcctg 420
gcatgccaaa agctgggagc cgaaattatt ggcactacgc tttctggcta taccacgcct 480

gaaacgccag aagagccgga tctggcgctg gtgaaaacgt tgagcgacgc cggatgtcgg 540
 gtgattgccg aagggcggtta caacacgcct gctcaggcgg cggatgcgat gcgccacggc 600
 gcgtggggcgg tgacggtcgg ttctgcaatc acgcgtcttg agcacatttg tcagtgttac 660
 aacacagcga tgaaaaaggc ggtgctatga 690

<210> 89
 <211> 346
 <212> PRT
 <213> Campylobacter jejuni

<400> 89

Met Lys Glu Ile Lys Ile Gln Asn Ile Ile Ile Ser Glu Glu Lys Ala
 1 5 10 15

Pro Leu Val Val Pro Glu Ile Gly Ile Asn His Asn Gly Ser Leu Glu
 20 25 30

Leu Ala Lys Ile Met Val Asp Ala Ala Phe Ser Ala Gly Ala Lys Ile
 35 40 45

Ile Lys His Gln Thr His Ile Val Glu Asp Glu Met Ser Lys Ala Ala
 50 55 60

Lys Lys Val Ile Pro Gly Asn Ala Lys Ile Ser Ile Tyr Glu Ile Met
 65 70 75 80

Gln Lys Cys Ala Leu Asp Tyr Lys Asp Glu Leu Ala Leu Lys Glu Tyr
 85 90 95

Thr Glu Lys Leu Gly Leu Val Tyr Leu Ser Thr Pro Phe Ser Arg Ala
 100 105 110

Gly Ala Asn Arg Leu Glu Asp Met Gly Val Ser Ala Phe Lys Ile Gly
 115 120 125

Ser Gly Glu Cys Asn Asn Tyr Pro Leu Ile Lys His Ile Ala Ala Phe
 130 135 140

Lys Lys Pro Met Ile Val Ser Thr Gly Met Asn Ser Ile Glu Ser Ile

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

<210> 90
 <211> 1041
 <212> DNA

<213> Campylobacter jejuni

<400> 90

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gccttttagcg caggtgctaa gattataaag catcaaacc acatcgttga agatgagatg      180
agtaaggccg ctaaaaaagt aattcctggg aatgcaaaaa taagcattta tgagattatg      240
caaaaatgtg ctttagatta taaagatgag ctagcactta aagaatacac agaaaaatta      300
ggctttgttt atcttagcac acctttttct cgtgcaggtg caaacgcgtt agaagatatg      360
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aaaccaactg taaaaatctt attagacaat gaaattccct ttgttttaat gcactcgacc      540
aatctttacc caaccccgca taatcttgta agattaaacg ctatgcttga attaaaaaaaa      600
gaattttctt gcatggtagg cttaagcgac cacacaacag ataatcttgc gtgttttaggt      660
gcggttgcac ttggtgcttg tgtgcttgaa agacatttta ctgatagtat gcatagaagt      720
ggccctgata tagtttggtc tatggataca aaggctttta aagagctaata tatccaaagt      780
gagcaaatgg ctataatgaa aggaaataat gaaagcaaaa aagcagctaa gcaagaacaa      840
gttacaattg attttgcctt tgcaagcgta gttagcatta aagatattaa aaaaggcgaa      900
gttttatcta tggacaatat ctgggttaaa agacctggac ttggtggaat tagtgcggt      960
gaatttgaaa atattttagg caaaaaagca ttaagagata tagaaaatga tactcagtta     1020
agctatgagg attttgcgtg a                                           1041
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<210> 91

<211> 221

<212> PRT

<213> Escherichia coli

<400> 91

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1           5           10          15
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Asn Lys Asn Leu Val Leu Leu Asn Asn Lys Pro Leu Ile Tyr Tyr Thr
20          25          30
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Ile Lys Ala Ala Leu Asn Ala Lys Ser Ile Ser Lys Val Val Val Ser
35 40 45

Ser Asp Ser Asp Glu Ile Leu Asn Tyr Ala Lys Ser Gln Asn Val Asp
50 55 60

Ile Leu Lys Arg Pro Ile Ser Leu Ala Gln Asp Asp Thr Thr Ser Asp
65 70 75 80

Lys Val Leu Leu His Ala Leu Lys Phe Tyr Lys Asp Tyr Glu Asp Val
85 90 95

Val Phe Leu Gln Pro Thr Ser Pro Leu Arg Thr Asn Ile His Ile Asn
100 105 110

Glu Ala Phe Asn Leu Tyr Lys Asn Ser Asn Ala Asn Ala Leu Ile Ser
115 120 125

Val Ser Glu Cys Asp Asn Lys Ile Leu Lys Ala Phe Val Cys Asn Asp
130 135 140

Cys Gly Asp Leu Ala Gly Ile Cys Asn Asp Glu Tyr Pro Phe Met Pro
145 150 155 160

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

Leu Lys Ile Lys Glu Phe Leu Asn Asn Pro Ser Phe Leu Gln Ser Lys
180 185 190

Thr Lys His Phe Leu Met Asp Glu Ser Ser Ser Leu Asp Ile Asp Cys
195 200 205

Leu Glu Asp Leu Lys Lys Val Glu Gln Ile Trp Lys Lys
210 215 220

<210> 92

<211> 666

<212> DNA

<213> Escherichia coli

<400> 92
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agtattagca aagtgggtgt gagctctgat tctgatgaaa tcctgaacta cgcaaaaagt 180
cagaacgttg atatcctgaa acgtccgatc agtctggcac aggatgatac cagagcgat 240
aaagtgctgc tgcattgcgt gaaattctac aaagattacg aagatgttgt gttcctgcag 300
ccgaccagcc cgctgcgtac gaatattcac atcaacgaag cgttcaacct gtacaaaaac 360
agcaacgcaa acgcgctgat ttctgttagt gaatgcgata acaaaatcct gaaagcgttt 420
gtgtgcaatg attgtggcga tctggccggt atttgtaacg atgaataccc gttcatgccg 480
cgccagaaac tgccgaaaac ctatatgagc aatggtgcc a tctacatcct gaaaatcaaa 540
gaattcctga acaaccgag cttcctgcag tctaaaacga aacatttcct gatggatgaa 600
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aaataa 666

<210> 93
<211> 417
<212> PRT
<213> Escherichia coli

<400> 93

Met Tyr Tyr Leu Lys Asn Thr Asn Phe Trp Met Phe Gly Leu Phe Phe
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Phe Phe Tyr Phe Phe Ile Met Gly Ala Tyr Phe Pro Phe Phe Pro Ile
20 25 30

Trp Leu His Asp Ile Asn His Ile Ser Lys Ser Asp Thr Gly Ile Ile
35 40 45

Phe Ala Ala Ile Ser Leu Phe Ser Leu Leu Phe Gln Pro Leu Phe Gly
50 55 60

Leu Leu Ser Asp Lys Leu Gly Leu Arg Lys Tyr Leu Leu Trp Ile Ile
65 70 75 80

Thr Gly Met Leu Val Met Phe Ala Pro Phe Phe Ile Phe Ile Phe Gly

85

90

95

Pro Leu Leu Gln Tyr Asn Ile Leu Val Gly Ser Ile Val Gly Gly Ile
 100 105 110

Tyr Leu Gly Phe Cys Phe Asn Ala Gly Ala Pro Ala Val Glu Ala Phe
 115 120 125

Ile Glu Lys Val Ser Arg Arg Ser Asn Phe Glu Phe Gly Arg Ala Arg
 130 135 140

Met Phe Gly Cys Val Gly Trp Ala Leu Cys Ala Ser Ile Val Gly Ile
 145 150 155 160

Met Phe Thr Ile Asn Asn Gln Phe Val Phe Trp Leu Gly Ser Gly Cys
 165 170 175

Ala Leu Ile Leu Ala Val Leu Leu Phe Phe Ala Lys Thr Asp Ala Pro
 180 185 190

Ser Ser Ala Thr Val Ala Asn Ala Val Gly Ala Asn His Ser Ala Phe
 195 200 205

Ser Leu Lys Leu Ala Leu Glu Leu Phe Arg Gln Pro Lys Leu Trp Phe
 210 215 220

Leu Ser Leu Tyr Val Ile Gly Val Ser Cys Thr Tyr Asp Val Phe Asp
 225 230 235 240

Gln Gln Phe Ala Asn Phe Phe Thr Ser Phe Phe Ala Thr Gly Glu Gln
 245 250 255

Gly Thr Arg Val Phe Gly Tyr Val Thr Thr Met Gly Glu Leu Leu Asn
 260 265 270

Ala Ser Ile Met Phe Phe Ala Pro Leu Ile Ile Asn Arg Ile Gly Gly
 275 280 285

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

Gly Ser Ser Phe Ala Thr Ser Ala Leu Glu Val Val Ile Leu Lys Thr
305 310 315 320

Leu His Met Phe Glu Val Pro Phe Leu Leu Val Gly Cys Phe Lys Tyr
325 330 335

Ile Thr Ser Gln Phe Glu Val Arg Phe Ser Ala Thr Ile Tyr Leu Val
340 345 350

Cys Phe Cys Phe Phe Lys Gln Leu Ala Met Ile Phe Met Ser Val Leu
355 360 365

Ala Gly Asn Met Tyr Glu Ser Ile Gly Phe Gln Gly Ala Tyr Leu Val
370 375 380

Leu Gly Leu Val Ala Leu Gly Phe Thr Leu Ile Ser Val Phe Thr Leu
385 390 395 400

Ser Gly Pro Gly Pro Leu Ser Leu Leu Arg Arg Gln Val Asn Glu Val
405 410 415

Ala

<210> 94
<211> 1254
<212> DNA
<213> Escherichia coli

<400> 94
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agcaaaagtg atacgggtat tatttttggc gctattttctc tgttctcgct attattccaa 180
ccgctgtttg gtctgctttc tgacaaactc gggctgcgca aatacctgct gtggattatt 240
accggcatgt tagtgatggt tgcgccgttc tttattttta tcttcgggcc actgtttacaa 300
tacaacattt tagtaggatac gattgttggg ggtattttatc taggcttttg ttttaacgcc 360
ggcgcgcag cagtagaggc atttattgag aaagtcagcc gtcgcagtaa tttcgaattt 420
ggcgcgcgc ggatgtttgg ctgtgttggc tgggcgctgt gtgcctcgat tgtcggcatc 480

Glu Ala Asp Thr Val Val Val Pro Ser Asn Trp Gln Met His Gly Tyr
85 90 95

Asp Ala Pro Ile Tyr Thr Asn Val Thr Tyr Pro Ile Thr Val Asn Pro
100 105 110

Pro Phe Val Pro Thr Glu Asn Pro Thr Gly Cys Tyr Ser Leu Thr Phe
115 120 125

Asn Val Asp Glu Ser Trp Leu Gln Glu Gly Gln Thr Arg Ile Ile Phe
130 135 140

Asp Gly Val Asn Ser Ala Phe His Leu Trp Cys Asn Gly Arg Trp Val
145 150 155 160

Gly Tyr Gly Gln Asp Ser Arg Leu Pro Ser Glu Phe Asp Leu Ser Ala
165 170 175

Phe Leu Arg Ala Gly Glu Asn Arg Leu Ala Val Met Val Leu Arg Trp
180 185 190

Ser Asp Gly Ser Tyr Leu Glu Asp Gln Asp Met Trp Arg Met Ser Gly
195 200 205

Ile Phe Arg Asp Val Ser Leu Leu His Lys Pro Thr Thr Gln Ile Ser
210 215 220

Asp Phe His Val Ala Thr Arg Phe Asn Asp Asp Phe Ser Arg Ala Val
225 230 235 240

Leu Glu Ala Glu Val Gln Met Cys Gly Glu Leu Arg Asp Tyr Leu Arg
245 250 255

Val Thr Val Ser Leu Trp Gln Gly Glu Thr Gln Val Ala Ser Gly Thr
260 265 270

Ala Pro Phe Gly Gly Glu Ile Ile Asp Glu Arg Gly Gly Tyr Ala Asp
275 280 285

Arg Val Thr Leu Arg Leu Asn Val Glu Asn Pro Lys Leu Trp Ser Ala

290

295

300

Glu Ile Pro Asn Leu Tyr Arg Ala Val Val Glu Leu His Thr Ala Asp
 305 310 315 320

Gly Thr Leu Ile Glu Ala Glu Ala Cys Asp Val Gly Phe Arg Glu Val
 325 330 335

Arg Ile Glu Asn Gly Leu Leu Leu Leu Asn Gly Lys Pro Leu Leu Ile
 340 345 350

Arg Gly Val Asn Arg His Glu His His Pro Leu His Gly Gln Val Met
 355 360 365

Asp Glu Gln Thr Met Val Gln Asp Ile Leu Leu Met Lys Gln Asn Asn
 370 375 380

Phe Asn Ala Val Arg Cys Ser His Tyr Pro Asn His Pro Leu Trp Tyr
 385 390 395 400

Thr Leu Cys Asp Arg Tyr Gly Leu Tyr Val Val Asp Glu Ala Asn Ile
 405 410 415

Glu Thr His Gly Met Val Pro Met Asn Arg Leu Thr Asp Asp Pro Arg
 420 425 430

Trp Leu Pro Ala Met Ser Glu Arg Val Thr Arg Met Val Gln Arg Asp
 435 440 445

Arg Asn His Pro Ser Val Ile Ile Trp Ser Leu Gly Asn Glu Ser Gly
 450 455 460

His Gly Ala Asn His Asp Ala Leu Tyr Arg Trp Ile Lys Ser Val Asp
 465 470 475 480

Pro Ser Arg Pro Val Gln Tyr Glu Gly Gly Gly Ala Asp Thr Thr Ala
 485 490 495

Thr Asp Ile Ile Cys Pro Met Tyr Ala Arg Val Asp Glu Asp Gln Pro
 500 505 510

Phe Pro Ala Val Pro Lys Trp Ser Ile Lys Lys Trp Leu Ser Leu Pro
515 520 525

Gly Glu Thr Arg Pro Leu Ile Leu Cys Glu Tyr Ala His Ala Met Gly
530 535 540

Asn Ser Leu Gly Gly Phe Ala Lys Tyr Trp Gln Ala Phe Arg Gln Tyr
545 550 555 560

Pro Arg Leu Gln Gly Gly Phe Val Trp Asp Trp Val Asp Gln Ser Leu
565 570 575

Ile Lys Tyr Asp Glu Asn Gly Asn Pro Trp Ser Ala Tyr Gly Gly Asp
580 585 590

Phe Gly Asp Thr Pro Asn Asp Arg Gln Phe Cys Met Asn Gly Leu Val
595 600 605

Phe Ala Asp Arg Thr Pro His Pro Ala Leu Thr Glu Ala Lys His Gln
610 615 620

Gln Gln Phe Phe Gln Phe Arg Leu Ser Gly Gln Thr Ile Glu Val Thr
625 630 635 640

Ser Glu Tyr Leu Phe Arg His Ser Asp Asn Glu Leu Leu His Trp Met
645 650 655

Val Ala Leu Asp Gly Lys Pro Leu Ala Ser Gly Glu Val Pro Leu Asp
660 665 670

Val Ala Pro Gln Gly Lys Gln Leu Ile Glu Leu Pro Glu Leu Pro Gln
675 680 685

Pro Glu Ser Ala Gly Gln Leu Trp Leu Thr Val Arg Val Val Gln Pro
690 695 700

Asn Ala Thr Ala Trp Ser Glu Ala Gly His Ile Ser Ala Trp Gln Gln
705 710 715 720

Trp Arg Leu Ala Glu Asn Leu Ser Val Thr Leu Pro Ala Ala Ser His

725

730

735

Ala Ile Pro His Leu Thr Thr Ser Glu Met Asp Phe Cys Ile Glu Leu
740 745 750

Gly Asn Lys Arg Trp Gln Phe Asn Arg Gln Ser Gly Phe Leu Ser Gln
755 760 765

Met Trp Ile Gly Asp Lys Lys Gln Leu Leu Thr Pro Leu Arg Asp Gln
770 775 780

Phe Thr Arg Ala Pro Leu Asp Asn Asp Ile Gly Val Ser Glu Ala Thr
785 790 795 800

Arg Ile Asp Pro Asn Ala Trp Val Glu Arg Trp Lys Ala Ala Gly His
805 810 815

Tyr Gln Ala Glu Ala Ala Leu Leu Gln Cys Thr Ala Asp Thr Leu Ala
820 825 830

Asp Ala Val Leu Ile Thr Thr Ala His Ala Trp Gln His Gln Gly Lys
835 840 845

Thr Leu Phe Ile Ser Arg Lys Thr Tyr Arg Ile Asp Gly Ser Gly Gln
850 855 860

Met Ala Ile Thr Val Asp Val Glu Val Ala Ser Asp Thr Pro His Pro
865 870 875 880

Ala Arg Ile Gly Leu Asn Cys Gln Leu Ala Gln Val Ala Glu Arg Val
885 890 895

Asn Trp Leu Gly Leu Gly Pro Gln Glu Asn Tyr Pro Asp Arg Leu Thr
900 905 910

Ala Ala Cys Phe Asp Arg Trp Asp Leu Pro Leu Ser Asp Met Tyr Thr
915 920 925

Pro Tyr Val Phe Pro Ser Glu Asn Gly Leu Arg Cys Gly Thr Arg Glu
930 935 940

Leu Asn Tyr Gly Pro His Gln Trp Arg Gly Asp Phe Gln Phe Asn Ile
 945 950 955 960

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

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