

SEQUENCE LISTING

<110> SENGENICS CORPORATION PTE LTD
CHINA MEDICAL UNIVERSITY HOSPITAL

<120> BIOMARKERS FOR PREDICTING IMMUNOGENICITY AND THERAPEUTIC
RESPONSES TO ADALIMUMAB IN RHEUMATOID ARTHRITIS PATIENTS

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 <213> Escherichia coli

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aacgacgaca tcaagcgtat cggcgtgcgt ctgcccggtc accagaagag gatcgcttac	2880
tccctgctgg gcctgaagga ccaagtgaac accgtgggta tccccatc	2928

<210> 20
 <211> 1143
 <212> DNA
 <213> Escherichia coli

<400> 20	
atggagtctg gcagtaccgc cgccagtgag gaggcacgca gccttcgaga atgtgagctc	60
tacgtccaga agcataacat tcaagcgtg ctcaaagatt ctattgtgca gttgtgact	120
gctcgacctg agagacccat ggcatcctc aggggaatact ttgagagggt ggagaaggag	180
gaggcaaac agattcagaa tctgcagaaa gcaggcactc gtacagactc aaggaggat	240
gagatttctc ctctccacc caaccagtg gttaaaggta ggaggcgacg aggtgctatc	300
agcgctgagg tctacacgga ggaagatgcg gcacacctat ttagaaagggt tataccaaaa	360
gattacaaga caatggccgc tttagccaaa gccattgaaa agaattgtgct gttttcacat	420
cttgatgata atgagagaag tgatatTTTT gatgccatgt tttcggctc ctttatcgca	480
ggagagactg tgattcagca aggtgatgaa ggggataact tctatgtgat tgatcaagga	540
gagacggatg tctatgttaa caatgaatgg gcaaccagtg ttggggaagg agggagcttt	600
ggagaacttg ctttgattta tggaacaccg agagcagcca ctgtcaaagc aaagacaaat	660

gtgaaattgt ggggcatcga ccgagacagc tatagaagaa tcctcatggg aagcacactg	720
agaaagcgga agatgtatga ggaattcctt agtaaagtct ctattttaga gtctctggac	780
aagtgggaac gtcttacggt agctgatgca ttggaaccag tgcagtttga agatgggcag	840
aagattgtgg tgcagggaga accaggggat gagttcttca ttattttaga ggggtcagct	900
gctgtgctac aacgtcggtc agaaaatgaa gagtttggtg aagtgggaag attggggcct	960
tctgattatt ttggtgaaat tgcactactg atgaatcgtc ctcgtgctgc cacagttggt	1020
gctcgtggcc ccttgaagtg cgtaagctg gaccgaccta gatttgaacg tgttcttggc	1080
ccatgctcag acatcctcaa acgaaacatc cagcagtaca acagttttgt gtcactgtct	1140
gtc	1143

<210> 21
 <211> 855
 <212> DNA
 <213> Escherichia coli

<400> 21	
atgaaccggc ttccggatga ctacgacccc tacgcggttg aagagcctag cgacgaggag	60
ccggctttga gcagctctga ggatgaagtg gatgtgcttt tacatggaac tcctgaccaa	120
aaacgaaaac tcatcagaga atgtcttacc ggagaaagtg aatcatctag tgaagatgaa	180
tttgaaaagg agatggaagc tgaattaaat tctaccatga aaacaatgga ggacaagtta	240
tcctctctgg gaactggatc ttcctcagga aatggaaaag ttgcaacagc tccgacaagg	300
tactacgatg atatatatat tgattctgat tccgaggatg aagacagagc agtacagggtg	360
accaagaaaa aaaagaagaa acaacacaag attccaacaa atgacgaatt actgtatgat	420
cctgaaaaag ataacagaga tcaggcctgg gttgatgcac agagaagggg ttaccatggt	480
ttgggaccac agagatcacg tgaacaacag cctgttccaa atagtgatgc tgtcttgaat	540
gttcctgcct gcatgaccac actttgcctt gattgccaaa ggcatgaatc atacaaaact	600
caatatagag caatgtttgt aatgaattgt tctattaaca aagaggaggt tctaagatat	660
aaagcctcag agaacaggaa gaaaaggcgg gtccataaga agatgaggtc taaccaggaa	720

gatgctgctg agaaggcaga gacagatgtg gaagaaatct atcaccagct catgtgcact 780
 gaatgttcca ctgaagtggc agtctacgac aaggatgaag tctttcattt tttcaatgtt 840
 ttagcaagcc attcc 855

<210> 22
 <211> 408
 <212> PRT
 <213> Escherichia coli

<400> 22

Met Ala Glu Asn Gly Asp Asn Glu Lys Met Ala Ala Leu Glu Ala Lys
 1 5 10 15

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

Asp Lys Phe Leu Lys Glu Gln Ile Lys Leu Asp Glu Gly Trp Val Pro
 35 40 45

Leu Glu Ile Met Ile Lys Phe Asn Arg Leu Asn Arg Leu Thr Thr Asp
 50 55 60

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

Glu Ile Ser Glu Asp Lys Thr Lys Ile Arg Arg Ser Pro Ser Lys Pro
 85 90 95

Leu Pro Glu Val Thr Asp Glu Tyr Lys Asn Asp Val Lys Asn Arg Ser
 100 105 110

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

Glu Trp Leu Glu Asp Lys Gly Gln Val Leu Asn Ile Gln Met Arg Arg
 130 135 140

Thr Leu His Lys Ala Phe Lys Gly Ser Ile Phe Val Val Phe Asp Ser
 145 150 155 160

Ile Glu Ser Ala Lys Lys Phe Val Glu Thr Pro Gly Gln Lys Tyr Lys
 165 170 175

Glu Thr Asp Leu Leu Ile Leu Phe Lys Asp Asp Tyr Phe Ala Lys Lys
 180 185 190

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

Gln Glu Gln Glu Ala Lys Gln Lys Leu Glu Glu Asp Ala Glu Met Lys
 210 215 220

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

Asp Asp Gln Thr Cys Arg Glu Asp Leu His Ile Leu Phe Ser Asn His
 245 250 255

Gly Glu Ile Lys Trp Ile Asp Phe Val Arg Gly Ala Lys Glu Gly Ile
 260 265 270

Ile Leu Phe Lys Glu Lys Ala Lys Glu Ala Leu Gly Lys Ala Lys Asp
 275 280 285

Ala Asn Asn Gly Asn Leu Gln Leu Arg Asn Lys Glu Val Thr Trp Glu
 290 295 300

Val Leu Glu Gly Glu Val Glu Lys Glu Ala Leu Lys Lys Ile Ile Glu
 305 310 315 320

Asp Gln Gln Glu Ser Leu Asn Lys Trp Lys Ser Lys Gly Arg Arg Phe
 325 330 335

Lys Gly Lys Gly Lys Gly Asn Lys Ala Ala Gln Pro Gly Ser Gly Lys
 340 345 350

Gly Lys Val Gln Phe Gln Gly Lys Lys Thr Lys Phe Ala Ser Asp Asp
355 360 365

Glu His Asp Glu His Asp Glu Asn Gly Ala Thr Gly Pro Val Lys Arg
370 375 380

Ala Arg Glu Glu Thr Asp Lys Glu Glu Pro Ala Ser Lys Gln Gln Lys
385 390 395 400

Thr Glu Asn Gly Ala Gly Asp Gln
405

<210> 23

<211> 538

<212> PRT

<213> Escherichia coli

<400> 23

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

Ala Asn Ser Gln Asp Gly Tyr Val Trp Gln Val Thr Asp Met Asn Arg
20 25 30

Leu His Arg Phe Leu Cys Phe Gly Ser Glu Gly Gly Thr Tyr Tyr Ile
35 40 45

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

Ile Glu Asp Gly Arg Gly Cys Glu Val Ile Gln Glu Ile Lys Ser Phe
65 70 75 80

Ser Gln Glu Gly Arg Thr Thr Lys Gln Glu Pro Met Leu Phe Ala Leu
85 90 95

Ala Ile Cys Ser Gln Cys Ser Asp Ile Ser Thr Lys Gln Ala Ala Phe

100	105	110																	
Lys	Ala	Val	Ser	Glu	Val	Cys	Arg	Ile	Pro	Thr	His	Leu	Phe	Thr	Phe				
	115						120					125							
Ile	Gln	Phe	Lys	Lys	Asp	Leu	Lys	Glu	Ser	Met	Lys	Cys	Gly	Met	Trp				
	130					135					140								
Gly	Arg	Ala	Leu	Arg	Lys	Ala	Ile	Ala	Asp	Trp	Tyr	Asn	Glu	Lys	Gly				
145					150					155					160				
Gly	Met	Ala	Leu	Ala	Leu	Ala	Val	Thr	Lys	Tyr	Lys	Gln	Arg	Asn	Gly				
			165						170					175					
Trp	Ser	His	Lys	Asp	Leu	Leu	Arg	Leu	Ser	His	Leu	Lys	Pro	Ser	Ser				
			180					185					190						
Glu	Gly	Leu	Ala	Ile	Val	Thr	Lys	Tyr	Ile	Thr	Lys	Gly	Trp	Lys	Glu				
	195						200					205							
Val	His	Glu	Leu	Tyr	Lys	Glu	Lys	Ala	Leu	Ser	Val	Glu	Thr	Glu	Lys				
	210					215					220								
Leu	Leu	Lys	Tyr	Leu	Glu	Ala	Val	Glu	Lys	Val	Lys	Arg	Thr	Arg	Asp				
225					230					235					240				
Glu	Leu	Glu	Val	Ile	His	Leu	Ile	Glu	Glu	His	Arg	Leu	Val	Arg	Glu				
			245					250						255					
His	Leu	Leu	Thr	Asn	His	Leu	Lys	Ser	Lys	Glu	Val	Trp	Lys	Ala	Leu				
			260					265					270						
Leu	Gln	Glu	Met	Pro	Leu	Thr	Ala	Leu	Leu	Arg	Asn	Leu	Gly	Lys	Met				
	275						280					285							
Thr	Ala	Asn	Ser	Val	Leu	Glu	Pro	Gly	Asn	Ser	Glu	Val	Ser	Leu	Val				
	290					295					300								

Cys Glu Lys Leu Cys Asn Glu Lys Leu Leu Lys Lys Ala Arg Ile His
305 310 315 320

Pro Phe His Ile Leu Ile Ala Leu Glu Thr Tyr Lys Thr Gly His Gly
325 330 335

Leu Arg Gly Lys Leu Lys Trp Arg Pro Asp Glu Glu Ile Leu Lys Ala
340 345 350

Leu Asp Ala Ala Phe Tyr Lys Thr Phe Lys Thr Val Glu Pro Thr Gly
355 360 365

Lys Arg Phe Leu Leu Ala Val Asp Val Ser Ala Ser Met Asn Gln Arg
370 375 380

Val Leu Gly Ser Ile Leu Asn Ala Ser Thr Val Ala Ala Ala Met Cys
385 390 395 400

Met Val Val Thr Arg Thr Glu Lys Asp Ser Tyr Val Val Ala Phe Ser
405 410 415

Asp Glu Met Val Pro Cys Pro Val Thr Thr Asp Met Thr Leu Gln Gln
420 425 430

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

Leu Pro Met Ile Trp Ala Gln Lys Thr Asn Thr Pro Ala Asp Val Phe
450 455 460

Ile Val Phe Thr Asp Asn Glu Thr Phe Ala Gly Gly Val His Pro Ala
465 470 475 480

Ile Ala Leu Arg Glu Tyr Arg Lys Lys Met Asp Ile Pro Ala Lys Leu
485 490 495

Ile Val Cys Gly Met Thr Ser Asn Gly Phe Thr Ile Ala Asp Pro Asp

500

505

510

Asp Arg Gly Met Leu Asp Met Cys Gly Phe Asp Thr Gly Ala Leu Asp
 515 520 525

Val Ile Arg Asn Phe Thr Leu Asp Met Ile
 530 535

<210> 24

<211> 837

<212> PRT

<213> Escherichia coli

<400> 24

Met Ala Ser Lys Arg Lys Ser Thr Thr Pro Cys Met Val Arg Thr Ser
 1 5 10 15

Gln Val Val Glu Gln Asp Val Pro Glu Glu Val Asp Arg Ala Lys Glu
 20 25 30

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

Ala Glu Leu Glu Asn Ser Ser Lys Glu Asn Glu Val Ile Glu Val Lys
 50 55 60

Ser Met Gly Glu Ser Gln Ser Lys Lys Leu Gln Gly Gly Tyr Glu Cys
 65 70 75 80

Lys Tyr Cys Pro Tyr Ser Thr Gln Asn Leu Asn Glu Phe Thr Glu His
 85 90 95

Val Asp Met Gln His Pro Asn Val Ile Leu Asn Pro Leu Tyr Val Cys
 100 105 110

Ala Glu Cys Asn Phe Thr Thr Lys Lys Tyr Asp Ser Leu Ser Asp His
 115 120 125

Asn Ser Lys Phe His Pro Gly Glu Ala Asn Phe Lys Leu Lys Leu Ile
130 135 140

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

His Val Val Ser Ile Thr Thr Ser Gly Pro Gly Thr Gly Asp Ser Asp
165 170 175

Ser Gly Ile Ser Val Ser Lys Thr Pro Ile Met Lys Pro Gly Lys Pro
180 185 190

Lys Ala Asp Ala Lys Lys Val Pro Lys Lys Pro Glu Glu Ile Thr Pro
195 200 205

Glu Asn His Val Glu Gly Thr Ala Arg Leu Val Thr Asp Thr Ala Glu
210 215 220

Ile Leu Ser Arg Leu Gly Gly Val Glu Leu Leu Gln Asp Thr Leu Gly
225 230 235 240

His Val Met Pro Ser Val Gln Leu Pro Pro Asn Ile Asn Leu Val Pro
245 250 255

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

Thr Asn Ala Thr Met Ile Asn Ser Phe Asn Lys Phe Pro Tyr Pro Thr
275 280 285

Gln Ala Glu Leu Ser Trp Leu Thr Ala Ala Ser Lys His Pro Glu Glu
290 295 300

His Ile Arg Ile Trp Phe Ala Thr Gln Arg Leu Lys His Gly Ile Ser
305 310 315 320

Trp Ser Pro Glu Glu Val Glu Glu Ala Arg Lys Lys Met Phe Asn Gly
325 330 335

Thr Ile Gln Ser Val Pro Pro Thr Ile Thr Val Leu Pro Ala Gln Leu
340 345 350

Ala Pro Thr Lys Val Thr Gln Pro Ile Leu Gln Thr Ala Leu Pro Cys
355 360 365

Gln Ile Leu Gly Gln Thr Ser Leu Val Leu Thr Gln Val Thr Ser Gly
370 375 380

Ser Thr Thr Val Ser Cys Ser Pro Ile Thr Leu Ala Val Ala Gly Val
385 390 395 400

Thr Asn His Gly Gln Lys Arg Pro Leu Val Thr Pro Gln Ala Ala Pro
405 410 415

Glu Pro Lys Arg Pro His Ile Ala Gln Val Pro Glu Pro Pro Pro Lys
420 425 430

Val Ala Asn Pro Pro Leu Thr Pro Ala Ser Asp Arg Lys Lys Thr Lys
435 440 445

Glu Gln Ile Ala His Leu Lys Ala Ser Phe Leu Gln Ser Gln Phe Pro
450 455 460

Asp Asp Ala Glu Val Tyr Arg Leu Ile Glu Val Thr Gly Leu Ala Arg
465 470 475 480

Ser Glu Ile Lys Lys Trp Phe Ser Asp His Arg Tyr Arg Cys Gln Arg
485 490 495

Gly Ile Val His Ile Thr Ser Glu Ser Leu Ala Lys Asp Gln Leu Ala
500 505 510

Ile Ala Ala Ser Arg His Gly Arg Thr Tyr His Ala Tyr Pro Asp Phe
515 520 525

Ala Pro Gln Lys Phe Lys Glu Lys Thr Gln Gly Gln Val Lys Ile Leu
530 535 540

Glu Asp Ser Phe Leu Lys Ser Ser Phe Pro Thr Gln Ala Glu Leu Asp
545 550 555 560

Arg Leu Arg Val Glu Thr Lys Leu Ser Arg Arg Glu Ile Asp Ser Trp
565 570 575

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

Asp Ser Met Gly Ser Gly Lys Lys Gly Gln Asp Val Gly Ala Pro Asn
595 600 605

Gly Ala Leu Ser Arg Leu Asp Gln Leu Ser Gly Ala Gln Leu Thr Ser
610 615 620

Ser Leu Pro Ser Pro Ser Pro Ala Ile Ala Lys Ser Gln Glu Gln Val
625 630 635 640

His Leu Leu Arg Ser Thr Phe Ala Arg Thr Gln Trp Pro Thr Pro Gln
645 650 655

Glu Tyr Asp Gln Leu Ala Ala Lys Thr Gly Leu Val Arg Thr Glu Ile
660 665 670

Val Arg Trp Phe Lys Glu Asn Arg Cys Leu Leu Lys Thr Gly Thr Val
675 680 685

Lys Trp Met Glu Gln Tyr Gln His Gln Pro Met Ala Asp Asp His Gly
690 695 700

Tyr Asp Ala Val Ala Arg Lys Ala Thr Lys Pro Met Ala Glu Ser Pro
705 710 715 720

Lys Asn Gly Gly Asp Val Val Pro Gln Tyr Tyr Lys Asp Pro Lys Lys
725 730 735

Leu Cys Glu Glu Asp Leu Glu Lys Leu Val Thr Arg Val Lys Val Gly
740 745 750

Ser Glu Pro Ala Lys Asp Cys Leu Pro Ala Lys Pro Ser Glu Ala Thr
755 760 765

Ser Asp Arg Ser Glu Gly Ser Ser Arg Asp Gly Gln Gly Ser Asp Glu
770 775 780

Asn Glu Glu Ser Ser Val Val Asp Tyr Val Glu Val Thr Val Gly Glu
785 790 795 800

Glu Asp Ala Ile Ser Asp Arg Ser Asp Ser Trp Ser Gln Ala Ala Ala
805 810 815

Glu Gly Val Ser Glu Leu Ala Glu Ser Asp Ser Asp Cys Val Pro Ala
820 825 830

Glu Ala Gly Gln Ala
835

<210> 25

<211> 441

<212> PRT

<213> Escherichia coli

<400> 25

Met Glu Gln Pro Gln Glu Glu Ala Pro Glu Val Arg Glu Glu Glu Glu
1 5 10 15

Lys Glu Glu Val Ala Glu Ala Glu Gly Ala Pro Glu Leu Asn Gly Gly
20 25 30

Pro Gln His Ala Leu Pro Ser Ser Ser Tyr Thr Asp Leu Ser Arg Ser
35 40 45

Ser Ser Pro Pro Ser Leu Leu Asp Gln Leu Gln Met Gly Cys Asp Gly

50

55

60

Ala Ser Cys Gly Ser Leu Asn Met Glu Cys Arg Val Cys Gly Asp Lys
65 70 75 80

Ala Ser Gly Phe His Tyr Gly Val His Ala Cys Glu Gly Cys Lys Gly
85 90 95

Phe Phe Arg Arg Thr Ile Arg Met Lys Leu Glu Tyr Glu Lys Cys Glu
100 105 110

Arg Ser Cys Lys Ile Gln Lys Lys Asn Arg Asn Lys Cys Gln Tyr Cys
115 120 125

Arg Phe Gln Lys Cys Leu Ala Leu Gly Met Ser His Asn Ala Ile Arg
130 135 140

Phe Gly Arg Met Pro Glu Ala Glu Lys Arg Lys Leu Val Ala Gly Leu
145 150 155 160

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

Ala Phe Ser Lys His Ile Tyr Asn Ala Tyr Leu Lys Asn Phe Asn Met
180 185 190

Thr Lys Lys Lys Ala Arg Ser Ile Leu Thr Gly Lys Ala Ser His Thr
195 200 205

Ala Pro Phe Val Ile His Asp Ile Glu Thr Leu Trp Gln Ala Glu Lys
210 215 220

Gly Leu Val Trp Lys Gln Leu Val Asn Gly Leu Pro Pro Tyr Lys Glu
225 230 235 240

Ile Ser Val His Val Phe Tyr Arg Cys Gln Cys Thr Thr Val Glu Thr
245 250 255

Val Arg Glu Leu Thr Glu Phe Ala Lys Ser Ile Pro Ser Phe Ser Ser
260 265 270

Leu Phe Leu Asn Asp Gln Val Thr Leu Leu Lys Tyr Gly Val His Glu
275 280 285

Ala Ile Phe Ala Met Leu Ala Ser Ile Val Asn Lys Asp Gly Leu Leu
290 295 300

Val Ala Asn Gly Ser Gly Phe Val Thr Arg Glu Phe Leu Arg Ser Leu
305 310 315 320

Arg Lys Pro Phe Ser Asp Ile Ile Glu Pro Lys Phe Glu Phe Ala Val
325 330 335

Lys Phe Asn Ala Leu Glu Leu Asp Asp Ser Asp Leu Ala Leu Phe Ile
340 345 350

Ala Ala Ile Ile Leu Cys Gly Asp Arg Pro Gly Leu Met Asn Val Pro
355 360 365

Arg Val Glu Ala Ile Gln Asp Thr Ile Leu Arg Ala Leu Glu Phe His
370 375 380

Leu Gln Ala Asn His Pro Asp Ala Gln Tyr Leu Phe Pro Lys Leu Leu
385 390 395 400

Gln Lys Met Ala Asp Leu Arg Gln Leu Val Thr Glu His Ala Gln Met
405 410 415

Met Gln Arg Ile Lys Lys Thr Glu Thr Glu Thr Ser Leu His Pro Leu
420 425 430

Leu Gln Glu Ile Tyr Lys Asp Met Tyr
435 440

<210> 26

<211> 180
<212> PRT
<213> Escherichia coli

<400> 26

Met Glu Gln Pro Thr Ser Ser Thr Asn Gly Glu Lys Arg Lys Ser Pro
1 5 10 15

Cys Glu Ser Asn Asn Lys Lys Asn Asp Glu Met Gln Glu Ala Pro Asn
20 25 30

Arg Val Leu Ala Pro Lys Gln Ser Leu Gln Lys Thr Lys Thr Ile Glu
35 40 45

Tyr Leu Thr Ile Ile Val Tyr Tyr Tyr Arg Lys His Thr Lys Ile Asn
50 55 60

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

Val Gln Glu Glu Glu Asp Glu Gly Leu Asp Ser Ala Glu Gly Ser Ser
85 90 95

Gln Glu Asp Glu Asp Leu Asp Ser Ser Glu Gly Ser Ser Gln Glu Asp
100 105 110

Glu Asp Leu Asp Ser Ser Glu Gly Ser Ser Gln Glu Asp Glu Asp Leu
115 120 125

Asp Ser Ser Glu Gly Ser Ser Gln Glu Asp Glu Asp Leu Asp Ser Ser
130 135 140

Glu Gly Ser Ser Gln Glu Asp Glu Asp Leu Asp Pro Pro Glu Gly Ser
145 150 155 160

Ser Gln Glu Asp Glu Asp Leu Asp Ser Ser Glu Gly Ser Ser Gln Glu
165 170 175

Gly Gly Glu Asp
180

<210> 27

<211> 353

<212> PRT

<213> Escherichia coli

<400> 27

Met Glu Lys Thr Leu Glu Thr Val Pro Leu Glu Arg Lys Lys Arg Glu
1 5 10 15

Lys Glu Gln Phe Arg Lys Leu Phe Ile Gly Gly Leu Ser Phe Glu Thr
20 25 30

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

Asp Cys Val Val Met Arg Asp Pro Ala Ser Lys Arg Ser Arg Gly Phe
50 55 60

Gly Phe Val Thr Phe Ser Ser Met Ala Glu Val Asp Ala Ala Met Ala
65 70 75 80

Ala Arg Pro His Ser Ile Asp Gly Arg Val Val Glu Pro Lys Arg Ala
85 90 95

Val Ala Arg Glu Glu Ser Gly Lys Pro Gly Ala His Val Thr Val Lys
100 105 110

Lys Leu Phe Val Gly Gly Ile Lys Glu Asp Thr Glu Glu His His Leu
115 120 125

Arg Asp Tyr Phe Glu Glu Tyr Gly Lys Ile Asp Thr Ile Glu Ile Ile
130 135 140

Thr Asp Arg Gln Ser Gly Lys Lys Arg Gly Phe Gly Phe Val Thr Phe
145 150 155 160

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

Ile Asn Gly His Asn Ala Glu Val Arg Lys Ala Leu Ser Arg Gln Glu
180 185 190

Met Gln Glu Val Gln Ser Ser Arg Ser Gly Arg Gly Gly Asn Phe Gly
195 200 205

Phe Gly Asp Ser Arg Gly Gly Gly Gly Asn Phe Gly Pro Gly Pro Gly
210 215 220

Ser Asn Phe Arg Gly Gly Ser Asp Gly Tyr Gly Ser Gly Arg Gly Phe
225 230 235 240

Gly Asp Gly Tyr Asn Gly Tyr Gly Gly Gly Pro Gly Gly Gly Asn Phe
245 250 255

Gly Gly Ser Pro Gly Tyr Gly Gly Gly Arg Gly Gly Tyr Gly Gly Gly
260 265 270

Gly Pro Gly Tyr Gly Asn Gln Gly Gly Gly Tyr Gly Gly Gly Tyr Asp
275 280 285

Asn Tyr Gly Gly Gly Asn Tyr Gly Ser Gly Asn Tyr Asn Asp Phe Gly
290 295 300

Asn Tyr Asn Gln Gln Pro Ser Asn Tyr Gly Pro Met Lys Ser Gly Asn
305 310 315 320

Phe Gly Gly Ser Arg Asn Met Gly Gly Pro Tyr Gly Gly Gly Asn Tyr
325 330 335

Gly Pro Gly Gly Ser Gly Gly Ser Gly Gly Tyr Gly Gly Arg Ser Arg
340 345 350

Tyr

<210> 28
<211> 343
<212> PRT
<213> Escherichia coli

<400> 28

Met Asn Ile His Arg Ser Thr Pro Ile Thr Ile Ala Arg Tyr Gly Arg
1 5 10 15

Ser Arg Asn Lys Thr Gln Asp Phe Glu Glu Leu Ser Ser Ile Arg Ser
20 25 30

Ala Glu Pro Ser Gln Ser Phe Ser Pro Asn Leu Gly Ser Pro Ser Pro
35 40 45

Pro Glu Thr Pro Asn Leu Ser His Cys Val Ser Cys Ile Gly Lys Tyr
50 55 60

Leu Leu Leu Glu Pro Leu Glu Gly Asp His Val Phe Arg Ala Val His
65 70 75 80

Leu His Ser Gly Glu Glu Leu Val Cys Lys Val Phe Asp Ile Ser Cys
85 90 95

Tyr Gln Glu Ser Leu Ala Pro Cys Phe Cys Leu Ser Ala His Ser Asn
100 105 110

Ile Asn Gln Ile Thr Glu Ile Ile Leu Gly Glu Thr Lys Ala Tyr Val
115 120 125

Phe Phe Glu Arg Ser Tyr Gly Asp Met His Ser Phe Val Arg Thr Cys
130 135 140

Lys Lys Leu Arg Glu Glu Glu Ala Ala Arg Leu Phe Tyr Gln Ile Ala
145 150 155 160

Ser Ala Val Ala His Cys His Asp Gly Gly Leu Val Leu Arg Asp Leu
165 170 175

Lys Leu Arg Lys Phe Ile Phe Lys Asp Glu Glu Arg Thr Arg Val Lys
180 185 190

Leu Glu Ser Leu Glu Asp Ala Tyr Ile Leu Arg Gly Asp Asp Asp Ser
195 200 205

Leu Ser Asp Lys His Gly Cys Pro Ala Tyr Val Ser Pro Glu Ile Leu
210 215 220

Asn Thr Ser Gly Ser Tyr Ser Gly Lys Ala Ala Asp Val Trp Ser Leu
225 230 235 240

Gly Val Met Leu Tyr Thr Met Leu Val Gly Arg Tyr Pro Phe His Asp
245 250 255

Ile Glu Pro Ser Ser Leu Phe Ser Lys Ile Arg Arg Gly Gln Phe Asn
260 265 270

Ile Pro Glu Thr Leu Ser Pro Lys Ala Lys Cys Leu Ile Arg Ser Ile
275 280 285

Leu Arg Arg Glu Pro Ser Glu Arg Leu Thr Ser Gln Glu Ile Leu Asp
290 295 300

His Pro Trp Phe Ser Thr Asp Phe Ser Val Ser Asn Ser Ala Tyr Gly
305 310 315 320

Ala Lys Glu Val Ser Asp Gln Leu Val Pro Asp Val Asn Met Glu Glu
325 330 335

Asn Leu Asp Pro Phe Phe Asn
340

<210> 29
<211> 464

<212> PRT

<213> Escherichia coli

<400> 29

Met Ser Ser Arg Ser Thr Lys Asp Leu Ile Lys Ser Lys Trp Gly Ser
1 5 10 15

Lys Pro Ser Asn Ser Lys Ser Glu Thr Thr Leu Glu Lys Leu Lys Gly
20 25 30

Glu Ile Ala His Leu Lys Thr Ser Val Asp Glu Ile Thr Ser Gly Lys
35 40 45

Gly Lys Leu Thr Asp Lys Glu Arg His Arg Leu Leu Glu Lys Ile Arg
50 55 60

Val Leu Glu Ala Glu Lys Glu Lys Asn Ala Tyr Gln Leu Thr Glu Lys
65 70 75 80

Asp Lys Glu Ile Gln Arg Leu Arg Asp Gln Leu Lys Ala Arg Tyr Ser
85 90 95

Thr Thr Thr Leu Leu Glu Gln Leu Glu Glu Thr Thr Arg Glu Gly Glu
100 105 110

Arg Arg Glu Gln Val Leu Lys Ala Leu Ser Glu Glu Lys Asp Val Leu
115 120 125

Lys Gln Gln Leu Ser Ala Ala Thr Ser Arg Ile Ala Glu Leu Glu Ser
130 135 140

Lys Thr Asn Thr Leu Arg Leu Ser Gln Thr Val Ala Pro Asn Cys Phe
145 150 155 160

Asn Ser Ser Ile Asn Asn Ile His Glu Met Glu Ile Gln Leu Lys Asp
165 170 175

Ala Leu Glu Lys Asn Gln Gln Trp Leu Val Tyr Asp Gln Gln Arg Glu

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

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

His Glu Phe Ala Ile Thr Glu Pro Leu Val Thr Phe Gln Gly Glu Thr
 405 410 415

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

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

Ala Thr Glu His Arg Asp Leu Leu Val His Val Glu Tyr Cys Ser Lys
 450 455 460

<210> 30
 <211> 368
 <212> PRT
 <213> Escherichia coli

<400> 30

Met Ser Val Ala Gly Leu Lys Lys Gln Phe Tyr Lys Ala Ser Gln Leu
 1 5 10 15

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

Phe Lys Glu Met Glu Lys Lys Val Asp Val Thr Ser Lys Ala Val Thr
 35 40 45

Glu Val Leu Ala Arg Thr Ile Glu Tyr Leu Gln Pro Asn Pro Ala Ser
 50 55 60

Arg Ala Lys Leu Thr Met Leu Asn Thr Val Ser Lys Ile Arg Gly Gln
 65 70 75 80

Val Lys Asn Pro Gly Tyr Pro Gln Ser Glu Gly Leu Leu Gly Glu Cys
 85 90 95

Met Ile Arg His Gly Lys Glu Leu Gly Gly Glu Ser Asn Phe Gly Asp
100 105 110

Ala Leu Leu Asp Ala Gly Glu Ser Met Lys Arg Leu Ala Glu Val Lys
115 120 125

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

Asn Leu Cys Glu Lys Asp Leu Lys Glu Ile Gln His His Leu Lys Lys
145 150 155 160

Leu Glu Gly Arg Arg Leu Asp Phe Asp Tyr Lys Lys Lys Arg Gln Gly
165 170 175

Lys Ile Pro Asp Glu Glu Leu Arg Gln Ala Leu Glu Lys Phe Glu Glu
180 185 190

Ser Lys Glu Val Ala Glu Thr Ser Met His Asn Leu Leu Glu Thr Asp
195 200 205

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

Tyr His Arg Gln Ala Val Gln Ile Leu Asp Glu Leu Ala Glu Lys Leu
225 230 235 240

Lys Arg Arg Met Arg Glu Ala Ser Ser Arg Pro Lys Arg Glu Tyr Lys
245 250 255

Pro Lys Pro Arg Glu Pro Phe Asp Leu Gly Glu Pro Glu Gln Ser Asn
260 265 270

Gly Gly Phe Pro Cys Thr Thr Ala Pro Lys Ile Ala Ala Ser Ser Ser
275 280 285

Phe Arg Ser Ser Asp Lys Pro Ile Arg Thr Pro Ser Arg Ser Met Pro
 290 295 300

Pro Leu Asp Gln Pro Ser Cys Lys Ala Leu Tyr Asp Phe Glu Pro Glu
 305 310 315 320

Asn Asp Gly Glu Leu Gly Phe His Glu Gly Asp Val Ile Thr Leu Thr
 325 330 335

Asn Gln Ile Asp Glu Asn Trp Tyr Glu Gly Met Leu Asp Gly Gln Ser
 340 345 350

Gly Phe Phe Pro Leu Ser Tyr Val Glu Val Leu Val Pro Leu Pro Gln
 355 360 365

<210> 31
 <211> 309
 <212> PRT
 <213> Escherichia coli

<400> 31

Met Glu Gln Leu Leu Arg Ala Glu Leu Arg Thr Ala Thr Leu Arg Ala
 1 5 10 15

Phe Gly Gly Pro Gly Ala Gly Cys Ile Ser Glu Gly Arg Ala Tyr Asp
 20 25 30

Thr Asp Ala Gly Pro Val Phe Val Lys Val Asn Arg Arg Thr Gln Ala
 35 40 45

Arg Gln Met Phe Glu Gly Glu Val Ala Ser Leu Glu Ala Leu Arg Ser
 50 55 60

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

Gly Gly Gly Ala Ala Phe Val Met Glu His Leu Lys Met Lys Ser Leu
 85 90 95

Ser Ser Gln Ala Ser Lys Leu Gly Glu Gln Met Ala Asp Leu His Leu
100 105 110

Tyr Asn Gln Lys Leu Arg Glu Lys Leu Lys Glu Glu Glu Asn Thr Val
115 120 125

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

Phe His Thr Val Thr Cys Cys Gly Phe Ile Pro Gln Val Asn Glu Trp
145 150 155 160

Gln Asp Asp Trp Pro Thr Phe Phe Ala Arg His Arg Leu Gln Ala Gln
165 170 175

Leu Asp Leu Ile Glu Lys Asp Tyr Ala Asp Arg Glu Ala Arg Glu Leu
180 185 190

Trp Ser Arg Leu Gln Val Lys Ile Pro Asp Leu Phe Cys Gly Leu Glu
195 200 205

Ile Val Pro Ala Leu Leu His Gly Asp Leu Trp Ser Gly Asn Val Ala
210 215 220

Glu Asp Asp Val Gly Pro Ile Ile Tyr Asp Pro Ala Ser Phe Tyr Gly
225 230 235 240

His Ser Glu Phe Glu Leu Ala Ile Ala Leu Met Phe Gly Gly Phe Pro
245 250 255

Arg Ser Phe Phe Thr Ala Tyr His Arg Lys Ile Pro Lys Ala Pro Gly
260 265 270

Phe Asp Gln Arg Leu Leu Leu Tyr Gln Leu Phe Asn Tyr Leu Asn His
275 280 285

Trp Asn His Phe Gly Arg Glu Tyr Arg Ser Pro Ser Leu Gly Thr Met

290

295

300

Arg Arg Leu Leu Lys
305

<210> 32

<211> 370

<212> PRT

<213> Escherichia coli

<400> 32

Met Lys Ile Lys Asp Ala Lys Lys Pro Ser Phe Pro Trp Phe Gly Met
1 5 10 15

Asp Ile Gly Gly Thr Leu Val Lys Leu Ser Tyr Phe Glu Pro Ile Asp
20 25 30

Ile Thr Ala Glu Glu Glu Gln Glu Glu Val Glu Ser Leu Lys Ser Ile
35 40 45

Arg Lys Tyr Leu Thr Ser Asn Val Ala Tyr Gly Ser Thr Gly Ile Arg
50 55 60

Asp Val His Leu Glu Leu Lys Asp Leu Thr Leu Phe Gly Arg Arg Gly
65 70 75 80

Asn Leu His Phe Ile Arg Phe Pro Thr Gln Asp Leu Pro Thr Phe Ile
85 90 95

Gln Met Gly Arg Asp Lys Asn Phe Ser Thr Leu Gln Thr Val Leu Cys
100 105 110

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

Gly Asn Leu His Leu His Lys Leu Asp Glu Leu Asp Cys Leu Val Lys
130 135 140

Gly Leu Leu Tyr Ile Asp Ser Val Ser Phe Asn Gly Gln Ala Glu Cys
 145 150 155 160

Tyr Tyr Phe Ala Asn Ala Ser Glu Pro Glu Arg Cys Gln Lys Met Pro
 165 170 175

Phe Asn Leu Asp Asp Pro Tyr Pro Leu Leu Val Val Asn Ile Gly Ser
 180 185 190

Gly Val Ser Ile Leu Ala Val His Ser Lys Asp Asn Tyr Lys Arg Val
 195 200 205

Thr Gly Thr Ser Leu Gly Gly Gly Thr Phe Leu Gly Leu Cys Ser Leu
 210 215 220

Leu Thr Gly Cys Glu Ser Phe Glu Glu Ala Leu Glu Met Ala Ser Lys
 225 230 235 240

Gly Asp Ser Thr Gln Ala Asp Lys Leu Val Arg Asp Ile Tyr Gly Gly
 245 250 255

Asp Tyr Glu Arg Phe Gly Leu Pro Gly Trp Ala Val Ala Ser Ser Phe
 260 265 270

Gly Asn Met Ile Tyr Lys Glu Lys Arg Glu Ser Val Ser Lys Glu Asp
 275 280 285

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

Ala Arg Met Cys Ala Val Asn Glu Lys Ile Asn Arg Val Val Phe Val
 305 310 315 320

Gly Asn Phe Leu Arg Val Asn Thr Leu Ser Met Lys Leu Leu Ala Tyr
 325 330 335

Ala Leu Asp Tyr Trp Ser Lys Gly Gln Leu Lys Ala Leu Phe Leu Glu
 340 345 350

His Glu Gly Tyr Phe Gly Ala Val Gly Ala Leu Leu Gly Leu Pro Asn
355 360 365

Phe Ser
370

<210> 33
<211> 193
<212> PRT
<213> Escherichia coli

<400> 33

Met Gly Lys Gln Asn Ser Lys Leu Arg Pro Glu Val Leu Gln Asp Leu
1 5 10 15

Arg Glu Asn Thr Glu Phe Thr Asp His Glu Leu Gln Glu Trp Tyr Lys
20 25 30

Gly Phe Leu Lys Asp Cys Pro Thr Gly His Leu Thr Val Asp Glu Phe
35 40 45

Lys Lys Ile Tyr Ala Asn Phe Phe Pro Tyr Gly Asp Ala Ser Lys Phe
50 55 60

Ala Glu His Val Phe Arg Thr Phe Asp Thr Asn Gly Asp Gly Thr Ile
65 70 75 80

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

Leu Glu Gln Lys Leu Lys Trp Ala Phe Ser Met Tyr Asp Leu Asp Gly
100 105 110

Asn Gly Tyr Ile Ser Arg Ser Glu Met Leu Glu Ile Val Gln Ala Ile
115 120 125

Tyr Lys Met Val Ser Ser Val Met Lys Met Pro Glu Asp Glu Ser Thr

130

135

140

Pro Glu Lys Arg Thr Asp Lys Ile Phe Arg Gln Met Asp Thr Asn Asn
 145 150 155 160

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

Pro Ser Ile Val Arg Leu Leu Gln Cys Asp Pro Ser Ser Ala Ser Gln
 180 185 190

Phe

<210> 34

<211> 490

<212> PRT

<213> Escherichia coli

<400> 34

Met Glu Gln Lys Pro Ser Lys Val Glu Cys Gly Ser Asp Pro Glu Glu
 1 5 10 15

Asn Ser Ala Arg Ser Pro Asp Gly Lys Arg Lys Arg Lys Asn Gly Gln
 20 25 30

Cys Ser Leu Lys Thr Ser Met Ser Gly Tyr Ile Pro Ser Tyr Leu Asp
 35 40 45

Lys Asp Glu Gln Cys Val Val Cys Gly Asp Lys Ala Thr Gly Tyr His
 50 55 60

Tyr Arg Cys Ile Thr Cys Glu Gly Cys Lys Gly Phe Phe Arg Arg Thr
 65 70 75 80

Ile Gln Lys Asn Leu His Pro Thr Tyr Ser Cys Lys Tyr Asp Ser Cys
 85 90 95

Cys Val Ile Asp Lys Ile Thr Arg Asn Gln Cys Gln Leu Cys Arg Phe
100 105 110

Lys Lys Cys Ile Ala Val Gly Met Ala Met Asp Leu Val Leu Asp Asp
115 120 125

Ser Lys Arg Val Ala Lys Arg Lys Leu Ile Glu Gln Asn Arg Glu Arg
130 135 140

Arg Arg Lys Glu Glu Met Ile Arg Ser Leu Gln Gln Arg Pro Glu Pro
145 150 155 160

Thr Pro Glu Glu Trp Asp Leu Ile His Ile Ala Thr Glu Ala His Arg
165 170 175

Ser Thr Asn Ala Gln Gly Ser His Trp Lys Gln Arg Arg Lys Phe Leu
180 185 190

Pro Asp Asp Ile Gly Gln Ser Pro Ile Val Ser Met Pro Asp Gly Asp
195 200 205

Lys Val Asp Leu Glu Ala Phe Ser Glu Phe Thr Lys Ile Ile Thr Pro
210 215 220

Ala Ile Thr Arg Val Val Asp Phe Ala Lys Lys Leu Pro Met Phe Ser
225 230 235 240

Glu Leu Pro Cys Glu Asp Gln Ile Ile Leu Leu Lys Gly Cys Cys Met
245 250 255

Glu Ile Met Ser Leu Arg Ala Ala Val Arg Tyr Asp Pro Glu Ser Asp
260 265 270

Thr Leu Thr Leu Ser Gly Glu Met Ala Val Lys Arg Glu Gln Leu Lys
275 280 285

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

Ser Leu Ser Ala Phe Asn Leu Asp Asp Thr Glu Val Ala Leu Leu Gln
305 310 315 320

Ala Val Leu Leu Met Ser Thr Asp Arg Ser Gly Leu Leu Cys Val Asp
325 330 335

Lys Ile Glu Lys Ser Gln Glu Ala Tyr Leu Leu Ala Phe Glu His Tyr
340 345 350

Val Asn His Arg Lys His Asn Ile Pro His Phe Trp Pro Lys Leu Leu
355 360 365

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

Ala Glu Gly Arg Pro Gly Gly Ser Leu Gly Val His Pro Glu Gly Gln
385 390 395 400

Gln Leu Leu Gly Met His Val Val Gln Gly Pro Gln Val Arg Gln Leu
405 410 415

Glu Gln Gln Leu Gly Glu Ala Gly Ser Leu Gln Gly Pro Val Leu Gln
420 425 430

His Gln Ser Pro Lys Ser Pro Gln Gln Arg Leu Leu Glu Leu Leu His
435 440 445

Arg Ser Gly Ile Leu His Ala Arg Ala Val Cys Gly Glu Asp Asp Ser
450 455 460

Ser Glu Ala Asp Ser Pro Ser Ser Ser Glu Glu Glu Pro Glu Val Cys
465 470 475 480

Glu Asp Leu Ala Gly Asn Ala Ala Ser Pro
485 490

<210> 35
<211> 613
<212> PRT
<213> Escherichia coli

<400> 35

Met Phe Arg Cys Gly Gly Leu Ala Ala Gly Ala Leu Lys Gln Lys Leu
1 5 10 15

Val Pro Leu Val Arg Thr Val Cys Val Arg Ser Pro Arg Gln Arg Asn
20 25 30

Arg Leu Pro Gly Asn Leu Phe Gln Arg Trp His Val Pro Leu Glu Leu
35 40 45

Gln Met Thr Arg Gln Met Ala Ser Ser Gly Ala Ser Gly Gly Lys Ile
50 55 60

Asp Asn Ser Val Leu Val Leu Ile Val Gly Leu Ser Thr Val Gly Ala
65 70 75 80

Gly Ala Tyr Ala Tyr Lys Thr Met Lys Glu Asp Glu Lys Arg Tyr Asn
85 90 95

Glu Arg Ile Ser Gly Leu Gly Leu Thr Pro Glu Gln Lys Gln Lys Lys
100 105 110

Ala Ala Leu Ser Ala Ser Glu Gly Glu Glu Val Pro Gln Asp Lys Ala
115 120 125

Pro Ser His Val Pro Phe Leu Leu Ile Gly Gly Gly Thr Ala Ala Phe
130 135 140

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

Ile Val Ser Glu Asp Pro Glu Leu Pro Tyr Met Arg Pro Pro Leu Ser
165 170 175

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

Phe Lys Gln Trp Asn Gly Lys Glu Arg Ser Ile Tyr Phe Gln Pro Pro
195 200 205

Ser Phe Tyr Val Ser Ala Gln Asp Leu Pro His Ile Glu Asn Gly Gly
210 215 220

Val Ala Val Leu Thr Gly Lys Lys Val Val Gln Leu Asp Val Arg Asp
225 230 235 240

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

Leu Ile Ala Thr Gly Gly Thr Pro Arg Ser Leu Ser Ala Ile Asp Arg
260 265 270

Ala Gly Ala Glu Val Lys Ser Arg Thr Thr Leu Phe Arg Lys Ile Gly
275 280 285

Asp Phe Arg Ser Leu Glu Lys Ile Ser Arg Glu Val Lys Ser Ile Thr
290 295 300

Ile Ile Gly Gly Gly Phe Leu Gly Ser Glu Leu Ala Cys Ala Leu Gly
305 310 315 320

Arg Lys Ala Arg Ala Leu Gly Thr Glu Val Ile Gln Leu Phe Pro Glu
325 330 335

Lys Gly Asn Met Gly Lys Ile Leu Pro Glu Tyr Leu Ser Asn Trp Thr
340 345 350

Met Glu Lys Val Arg Arg Glu Gly Val Lys Val Met Pro Asn Ala Ile
355 360 365

Val Gln Ser Val Gly Val Ser Ser Gly Lys Leu Leu Ile Lys Leu Lys

370

375

380

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

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

Asp Phe Gly Gly Phe Arg Val Asn Ala Glu Leu Gln Ala Arg Ser Asn
 420 425 430

Ile Trp Val Ala Gly Asp Ala Ala Cys Phe Tyr Asp Ile Lys Leu Gly
 435 440 445

Arg Arg Arg Val Glu His His Asp His Ala Val Val Ser Gly Arg Leu
 450 455 460

Ala Gly Glu Asn Met Thr Gly Ala Ala Lys Pro Tyr Trp His Gln Ser
 465 470 475 480

Met Phe Trp Ser Asp Leu Gly Pro Asp Val Gly Tyr Glu Ala Ile Gly
 485 490 495

Leu Val Asp Ser Ser Leu Pro Thr Val Gly Val Phe Ala Lys Ala Thr
 500 505 510

Ala Gln Asp Asn Pro Lys Ser Ala Thr Glu Gln Ser Gly Thr Gly Ile
 515 520 525

Arg Ser Glu Ser Glu Thr Glu Ser Glu Ala Ser Glu Ile Thr Ile Pro
 530 535 540

Pro Ser Thr Pro Ala Val Pro Gln Ala Pro Val Gln Gly Glu Asp Tyr
 545 550 555 560

Gly Lys Gly Val Ile Phe Tyr Leu Arg Asp Lys Val Val Val Gly Ile
 565 570 575

Val Leu Trp Asn Ile Phe Asn Arg Met Pro Ile Ala Arg Lys Ile Ile
580 585 590

Lys Asp Gly Glu Gln His Glu Asp Leu Asn Glu Val Ala Lys Leu Phe
595 600 605

Asn Ile His Glu Asp
610

<210> 36
<211> 461
<212> PRT
<213> Escherichia coli

<400> 36

Met Asn Asn Phe Gly Asn Glu Glu Phe Asp Cys His Phe Leu Asp Glu
1 5 10 15

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

Ser Ser Asp Asp Lys Asp Ala Phe Tyr Val Ala Asp Leu Gly Asp Ile
35 40 45

Leu Lys Lys His Leu Arg Trp Leu Lys Ala Leu Pro Arg Val Thr Pro
50 55 60

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

Ala Ala Thr Gly Thr Gly Phe Asp Cys Ala Ser Lys Thr Glu Ile Gln
85 90 95

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

Pro Cys Lys Gln Val Ser Gln Ile Lys Tyr Ala Ala Asn Asn Gly Val
115 120 125

Gln Met Met Thr Phe Asp Ser Glu Val Glu Leu Met Lys Val Ala Arg
130 135 140

Ala His Pro Lys Ala Lys Leu Val Leu Arg Ile Ala Thr Asp Asp Ser
145 150 155 160

Lys Ala Val Cys Arg Leu Ser Val Lys Phe Gly Ala Thr Leu Arg Thr
165 170 175

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

Gly Val Ser Phe His Val Gly Ser Gly Cys Thr Asp Pro Glu Thr Phe
195 200 205

Val Gln Ala Ile Ser Asp Ala Arg Cys Val Phe Asp Met Gly Ala Glu
210 215 220

Val Gly Phe Ser Met Tyr Leu Leu Asp Ile Gly Gly Gly Phe Pro Gly
225 230 235 240

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

Pro Ala Leu Asp Lys Tyr Phe Pro Ser Asp Ser Gly Val Arg Ile Ile
260 265 270

Ala Glu Pro Gly Arg Tyr Tyr Val Ala Ser Ala Phe Thr Leu Ala Val
275 280 285

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

Asp Glu Asp Glu Ser Ser Glu Gln Thr Phe Met Tyr Tyr Val Asn Asp
305 310 315 320

Gly Val Tyr Gly Ser Phe Asn Cys Ile Leu Tyr Asp His Ala His Val
325 330 335

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

Ser Ser Ile Trp Gly Pro Thr Cys Asp Gly Leu Asp Arg Ile Val Glu
355 360 365

Arg Cys Asp Leu Pro Glu Met His Val Gly Asp Trp Met Leu Phe Glu
370 375 380

Asn Met Gly Ala Tyr Thr Val Ala Ala Ala Ser Thr Phe Asn Gly Phe
385 390 395 400

Gln Arg Pro Thr Ile Tyr Tyr Val Met Ser Gly Pro Ala Trp Gln Leu
405 410 415

Met Gln Gln Phe Gln Asn Pro Asp Phe Pro Pro Glu Val Glu Glu Gln
420 425 430

Asp Ala Ser Thr Leu Pro Val Ser Cys Ala Trp Glu Ser Gly Met Lys
435 440 445

Arg His Arg Ala Ala Cys Ala Ser Ala Ser Ile Asn Val
450 455 460

<210> 37
<211> 772
<212> PRT
<213> Escherichia coli

<400> 37

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

Thr Glu Ala Asn Leu Thr Gly His Glu Glu Lys Val Ser Val Glu Asn
20 25 30

Phe Glu Leu Leu Lys Val Leu Gly Thr Gly Ala Tyr Gly Lys Val Phe
35 40 45

Leu Val Arg Lys Ala Gly Gly His Asp Ala Gly Lys Leu Tyr Ala Met
50 55 60

Lys Val Leu Arg Lys Ala Ala Leu Val Gln Arg Ala Lys Thr Gln Glu
65 70 75 80

His Thr Arg Thr Glu Arg Ser Val Leu Glu Leu Val Arg Gln Ala Pro
85 90 95

Phe Leu Val Thr Leu His Tyr Ala Phe Gln Thr Asp Ala Lys Leu His
100 105 110

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

Gln Arg Gln Tyr Phe Lys Glu Ala Glu Val Arg Val Tyr Gly Gly Glu
130 135 140

Ile Val Leu Ala Leu Glu His Leu His Lys Leu Gly Ile Ile Tyr Arg
145 150 155 160

Asp Leu Lys Leu Glu Asn Val Leu Leu Asp Ser Glu Gly His Ile Val
165 170 175

Leu Thr Asp Phe Gly Leu Ser Lys Glu Phe Leu Thr Glu Glu Lys Glu
180 185 190

Arg Thr Phe Ser Phe Cys Gly Thr Ile Glu Tyr Met Ala Pro Glu Ile
195 200 205

Ile Arg Ser Lys Thr Gly His Gly Lys Ala Val Asp Trp Trp Ser Leu
210 215 220

Gly Ile Leu Leu Phe Glu Leu Leu Thr Gly Ala Ser Pro Phe Thr Leu

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

Ser Gly Gln Glu Phe Ala Val Lys Ile Leu Ser Arg Arg Leu Glu Ala
435 440 445

Asn Thr Gln Arg Glu Val Ala Ala Leu Arg Leu Cys Gln Ser His Pro
450 455 460

Asn Val Val Asn Leu His Glu Val His His Asp Gln Leu His Thr Tyr
465 470 475 480

Leu Val Leu Glu Leu Leu Arg Gly Gly Glu Leu Leu Glu His Ile Arg
485 490 495

Lys Lys Arg His Phe Ser Glu Ser Glu Ala Ser Gln Ile Leu Arg Ser
500 505 510

Leu Val Ser Ala Val Ser Phe Met His Glu Glu Ala Gly Val Val His
515 520 525

Arg Asp Leu Lys Pro Glu Asn Ile Leu Tyr Ala Asp Asp Thr Pro Gly
530 535 540

Ala Pro Val Lys Ile Ile Asp Phe Gly Phe Ala Arg Leu Arg Pro Gln
545 550 555 560

Ser Pro Gly Val Pro Met Gln Thr Pro Cys Phe Thr Leu Gln Tyr Ala
565 570 575

Ala Pro Glu Leu Leu Ala Gln Gln Gly Tyr Asp Glu Ser Cys Asp Leu
580 585 590

Trp Ser Leu Gly Val Ile Leu Tyr Met Met Leu Ser Gly Gln Val Pro
595 600 605

Phe Gln Gly Ala Ser Gly Gln Gly Gly Gln Ser Gln Ala Ala Glu Ile
610 615 620

Met Cys Lys Ile Arg Glu Gly Arg Phe Ser Leu Asp Gly Glu Ala Trp

Lys Tyr Asp Asp Ala Glu Arg Arg Phe Tyr Glu Gln Met Asn Gly Pro
20 25 30

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

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

Ser Gly Pro Gly Ala Ser Ser Gly Thr Ser Gly Asp His Gly Glu Leu
65 70 75 80

Val Val Arg Ile Ala Ser Leu Glu Val Glu Asn Gln Ser Leu Arg Gly
85 90 95

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

Asn Val Leu Glu Lys Ser Ser Pro Gly His Arg Ala Thr Ala Pro Gln
115 120 125

Thr Gln His Val Ser Pro Met Arg Gln Val Glu Pro Pro Ala Lys Lys
130 135 140

Pro Ala Thr Pro Ala Glu Asp Asp Glu Asp Asp Asp Ile Asp Leu Phe
145 150 155 160

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

Glu Arg Leu Arg Gln Tyr Ala Glu Lys Lys Ala Lys Lys Pro Ala Leu
180 185 190

Val Ala Lys Ser Ser Ile Leu Leu Asp Val Lys Pro Trp Asp Asp Glu
195 200 205

Thr Asp Met Ala Gln Leu Glu Ala Cys Val Arg Ser Ile Gln Leu Asp
210 215 220

Gly Leu Val Trp Gly Ala Ser Lys Leu Val Pro Val Gly Tyr Gly Ile
 225 230 235 240

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

Asp Leu Leu Glu Glu Glu Ile Thr Lys Phe Glu Glu His Val Gln Ser
 260 265 270

Val Asp Ile Ala Ala Phe Asn Lys Ile
 275 280

<210> 39

<211> 480

<212> PRT

<213> Escherichia coli

<400> 39

Met Leu Asn Phe Gly Ala Ser Leu Gln Gln Thr Ala Glu Glu Arg Met
 1 5 10 15

Glu Met Ile Ser Glu Arg Pro Lys Glu Ser Met Tyr Ser Trp Asn Lys
 20 25 30

Thr Ala Glu Lys Ser Asp Phe Glu Ala Val Glu Ala Leu Met Ser Met
 35 40 45

Ser Cys Ser Trp Lys Ser Asp Phe Lys Lys Tyr Val Glu Asn Arg Pro
 50 55 60

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

Thr Pro Asp Phe His Thr Ile Pro Ala Phe Cys Leu Thr Pro Pro Tyr
 85 90 95

Ser Pro Ser Asp Phe Glu Pro Ser Gln Val Ser Asn Leu Met Ala Pro

100	105	110
Ala Pro Ser Thr Val His Phe Lys Ser Leu Ser Asp Thr Ala Lys Pro		
115	120	125
His Ile Ala Ala Pro Phe Lys Glu Glu Glu Lys Ser Pro Val Ser Ala		
130	135	140
Pro Lys Leu Pro Lys Ala Gln Ala Thr Ser Val Ile Arg His Thr Ala		
145	150	155
Asp Ala Gln Leu Cys Asn His Gln Thr Cys Pro Met Lys Ala Ala Ser		
165	170	175
Ile Leu Asn Tyr Gln Asn Asn Ser Phe Arg Arg Arg Thr His Leu Asn		
180	185	190
Val Glu Ala Ala Arg Lys Asn Ile Pro Cys Ala Ala Val Ser Pro Asn		
195	200	205
Arg Ser Lys Cys Glu Arg Asn Thr Val Ala Asp Val Asp Glu Lys Ala		
210	215	220
Ser Ala Ala Leu Tyr Asp Phe Ser Val Pro Ser Ser Glu Thr Val Ile		
225	230	235
Cys Arg Ser Gln Pro Ala Pro Val Ser Pro Gln Gln Lys Ser Val Leu		
245	250	255
Val Ser Pro Pro Ala Val Ser Ala Gly Gly Val Pro Pro Met Pro Val		
260	265	270
Ile Cys Gln Met Val Pro Leu Pro Ala Asn Asn Pro Val Val Thr Thr		
275	280	285
Val Val Pro Ser Thr Pro Pro Ser Gln Pro Pro Ala Val Cys Pro Pro		
290	295	300

Val Val Phe Met Gly Thr Gln Val Pro Lys Gly Ala Val Met Phe Val
 305 310 315 320

Val Pro Gln Pro Val Val Gln Ser Ser Lys Pro Pro Val Val Ser Pro
 325 330 335

Asn Gly Thr Arg Leu Ser Pro Ile Ala Pro Ala Pro Gly Phe Ser Pro
 340 345 350

Ser Ala Ala Lys Val Thr Pro Gln Ile Asp Ser Ser Arg Ile Arg Ser
 355 360 365

His Ile Cys Ser His Pro Gly Cys Gly Lys Thr Tyr Phe Lys Ser Ser
 370 375 380

His Leu Lys Ala His Thr Arg Thr His Thr Gly Glu Lys Pro Phe Ser
 385 390 395 400

Cys Ser Trp Lys Gly Cys Glu Arg Arg Phe Ala Arg Ser Asp Glu Leu
 405 410 415

Ser Arg His Arg Arg Thr His Thr Gly Glu Lys Lys Phe Ala Cys Pro
 420 425 430

Met Cys Asp Arg Arg Phe Met Arg Ser Asp His Leu Thr Lys His Ala
 435 440 445

Arg Arg His Leu Ser Ala Lys Lys Leu Pro Asn Trp Gln Met Glu Val
 450 455 460

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

<210> 40
 <211> 976
 <212> PRT
 <213> Escherichia coli

<400> 40

Met Glu Leu Gln Ala Ala Arg Ala Cys Phe Ala Leu Leu Trp Gly Cys
1 5 10 15

Ala Leu Ala Ala Ala Ala Ala Ala Gln Gly Lys Glu Val Val Leu Leu
20 25 30

Asp Phe Ala Ala Ala Gly Gly Glu Leu Gly Trp Leu Thr His Pro Tyr
35 40 45

Gly Lys Gly Trp Asp Leu Met Gln Asn Ile Met Asn Asp Met Pro Ile
50 55 60

Tyr Met Tyr Ser Val Cys Asn Val Met Ser Gly Asp Gln Asp Asn Trp
65 70 75 80

Leu Arg Thr Asn Trp Val Tyr Arg Gly Glu Ala Glu Arg Ile Phe Ile
85 90 95

Glu Leu Lys Phe Thr Val Arg Asp Cys Asn Ser Phe Pro Gly Gly Ala
100 105 110

Ser Ser Cys Lys Glu Thr Phe Asn Leu Tyr Tyr Ala Glu Ser Asp Leu
115 120 125

Asp Tyr Gly Thr Asn Phe Gln Lys Arg Leu Phe Thr Lys Ile Asp Thr
130 135 140

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

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

Gly Phe Tyr Leu Ala Phe Gln Asp Ile Gly Ala Cys Val Ala Leu Leu
180 185 190

Ser Val Arg Val Tyr Tyr Lys Lys Cys Pro Glu Leu Leu Gln Gly Leu
195 200 205

Ala His Phe Pro Glu Thr Ile Ala Gly Ser Asp Ala Pro Ser Leu Ala
210 215 220

Thr Val Ala Gly Thr Cys Val Asp His Ala Val Val Pro Pro Gly Gly
225 230 235 240

Glu Glu Pro Arg Met His Cys Ala Val Asp Gly Glu Trp Leu Val Pro
245 250 255

Ile Gly Gln Cys Leu Cys Gln Ala Gly Tyr Glu Lys Val Glu Asp Ala
260 265 270

Cys Gln Ala Cys Ser Pro Gly Phe Phe Lys Phe Glu Ala Ser Glu Ser
275 280 285

Pro Cys Leu Glu Cys Pro Glu His Thr Leu Pro Ser Pro Glu Gly Ala
290 295 300

Thr Ser Cys Glu Cys Glu Glu Gly Phe Phe Arg Ala Pro Gln Asp Pro
305 310 315 320

Ala Ser Met Pro Cys Thr Arg Pro Pro Ser Ala Pro His Tyr Leu Thr
325 330 335

Ala Val Gly Met Gly Ala Lys Val Glu Leu Arg Trp Thr Pro Pro Gln
340 345 350

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

Cys Trp Pro Glu Ser Gly Glu Cys Gly Pro Cys Glu Ala Ser Val Arg
370 375 380

Tyr Ser Glu Pro Pro His Gly Leu Thr Arg Thr Ser Val Thr Val Ser
385 390 395 400

Asp Leu Glu Pro His Met Asn Tyr Thr Phe Thr Val Glu Ala Arg Asn
405 410 415

Gly Val Ser Gly Leu Val Thr Ser Arg Ser Phe Arg Thr Ala Ser Val
420 425 430

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

Thr Thr Ser Leu Ser Val Ser Trp Ser Ile Pro Pro Pro Gln Gln Ser
450 455 460

Arg Val Trp Lys Tyr Glu Val Thr Tyr Arg Lys Lys Gly Asp Ser Asn
465 470 475 480

Ser Tyr Asn Val Arg Arg Thr Glu Gly Phe Ser Val Thr Leu Asp Asp
485 490 495

Leu Ala Pro Asp Thr Thr Tyr Leu Val Gln Val Gln Ala Leu Thr Gln
500 505 510

Glu Gly Gln Gly Ala Gly Ser Lys Val His Glu Phe Gln Thr Leu Ser
515 520 525

Pro Glu Gly Ser Gly Asn Leu Ala Val Ile Gly Gly Val Ala Val Gly
530 535 540

Val Val Leu Leu Leu Val Leu Ala Gly Val Gly Phe Phe Ile His Arg
545 550 555 560

Arg Arg Lys Asn Gln Arg Ala Arg Gln Ser Pro Glu Asp Val Tyr Phe
565 570 575

Ser Lys Ser Glu Gln Leu Lys Pro Leu Lys Thr Tyr Val Asp Pro His
580 585 590

Thr Tyr Glu Asp Pro Asn Gln Ala Val Leu Lys Phe Thr Thr Glu Ile
595 600 605

His Pro Ser Cys Val Thr Arg Gln Lys Val Ile Gly Ala Gly Glu Phe
610 615 620

Gly Glu Val Tyr Lys Gly Met Leu Lys Thr Ser Ser Gly Lys Lys Glu
625 630 635 640

Val Pro Val Ala Ile Lys Thr Leu Lys Ala Gly Tyr Thr Glu Lys Gln
645 650 655

Arg Val Asp Phe Leu Gly Glu Ala Gly Ile Met Gly Gln Phe Ser His
660 665 670

His Asn Ile Ile Arg Leu Glu Gly Val Ile Ser Lys Tyr Lys Pro Met
675 680 685

Met Ile Ile Thr Glu Tyr Met Glu Asn Gly Ala Leu Asp Lys Phe Leu
690 695 700

Arg Glu Lys Asp Gly Glu Phe Ser Val Leu Gln Leu Val Gly Met Leu
705 710 715 720

Arg Gly Ile Ala Ala Gly Met Lys Tyr Leu Ala Asn Met Asn Tyr Val
725 730 735

His Arg Asp Leu Ala Ala Arg Asn Ile Leu Val Asn Ser Asn Leu Val
740 745 750

Cys Lys Val Ser Asp Phe Gly Leu Ser Arg Val Leu Glu Asp Asp Pro
755 760 765

Glu Ala Thr Tyr Thr Thr Ser Gly Gly Lys Ile Pro Ile Arg Trp Thr
770 775 780

Ala Pro Glu Ala Ile Ser Tyr Arg Lys Phe Thr Ser Ala Ser Asp Val
785 790 795 800

Trp Ser Phe Gly Ile Val Met Trp Glu Val Met Thr Tyr Gly Glu Arg
805 810 815

Pro Tyr Trp Glu Leu Ser Asn His Glu Val Met Lys Ala Ile Asn Asp
820 825 830

Gly Phe Arg Leu Pro Thr Pro Met Asp Cys Pro Ser Ala Ile Tyr Gln
835 840 845

Leu Met Met Gln Cys Trp Gln Gln Glu Arg Ala Arg Arg Pro Lys Phe
850 855 860

Ala Asp Ile Val Ser Ile Leu Asp Lys Leu Ile Arg Ala Pro Asp Ser
865 870 875 880

Leu Lys Thr Leu Ala Asp Phe Asp Pro Arg Val Ser Ile Arg Leu Pro
885 890 895

Ser Thr Ser Gly Ser Glu Gly Val Pro Phe Arg Thr Val Ser Glu Trp
900 905 910

Leu Glu Ser Ile Lys Met Gln Gln Tyr Thr Glu His Phe Met Ala Ala
915 920 925

Gly Tyr Thr Ala Ile Glu Lys Val Val Gln Met Thr Asn Asp Asp Ile
930 935 940

Lys Arg Ile Gly Val Arg Leu Pro Gly His Gln Lys Arg Ile Ala Tyr
945 950 955 960

Ser Leu Leu Gly Leu Lys Asp Gln Val Asn Thr Val Gly Ile Pro Ile
965 970 975

<210> 41

<211> 381

<212> PRT

<213> Escherichia coli

<400> 41

Met Glu Ser Gly Ser Thr Ala Ala Ser Glu Glu Ala Arg Ser Leu Arg
1 5 10 15

Glu Cys Glu Leu Tyr Val Gln Lys His Asn Ile Gln Ala Leu Leu Lys
20 25 30

Asp Ser Ile Val Gln Leu Cys Thr Ala Arg Pro Glu Arg Pro Met Ala
35 40 45

Phe Leu Arg Glu Tyr Phe Glu Arg Leu Glu Lys Glu Glu Ala Lys Gln
50 55 60

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

Glu Ile Ser Pro Pro Pro Pro Asn Pro Val Val Lys Gly Arg Arg Arg
85 90 95

Arg Gly Ala Ile Ser Ala Glu Val Tyr Thr Glu Glu Asp Ala Ala Ser
100 105 110

Tyr Val Arg Lys Val Ile Pro Lys Asp Tyr Lys Thr Met Ala Ala Leu
115 120 125

Ala Lys Ala Ile Glu Lys Asn Val Leu Phe Ser His Leu Asp Asp Asn
130 135 140

Glu Arg Ser Asp Ile Phe Asp Ala Met Phe Ser Val Ser Phe Ile Ala
145 150 155 160

Gly Glu Thr Val Ile Gln Gln Gly Asp Glu Gly Asp Asn Phe Tyr Val
165 170 175

Ile Asp Gln Gly Glu Thr Asp Val Tyr Val Asn Asn Glu Trp Ala Thr
180 185 190

Ser Val Gly Glu Gly Gly Ser Phe Gly Glu Leu Ala Leu Ile Tyr Gly
195 200 205

Thr Pro Arg Ala Ala Thr Val Lys Ala Lys Thr Asn Val Lys Leu Trp
210 215 220

Gly Ile Asp Arg Asp Ser Tyr Arg Arg Ile Leu Met Gly Ser Thr Leu
225 230 235 240

Arg Lys Arg Lys Met Tyr Glu Glu Phe Leu Ser Lys Val Ser Ile Leu
245 250 255

Glu Ser Leu Asp Lys Trp Glu Arg Leu Thr Val Ala Asp Ala Leu Glu
260 265 270

Pro Val Gln Phe Glu Asp Gly Gln Lys Ile Val Val Gln Gly Glu Pro
275 280 285

Gly Asp Glu Phe Phe Ile Ile Leu Glu Gly Ser Ala Ala Val Leu Gln
290 295 300

Arg Arg Ser Glu Asn Glu Glu Phe Val Glu Val Gly Arg Leu Gly Pro
305 310 315 320

Ser Asp Tyr Phe Gly Glu Ile Ala Leu Leu Met Asn Arg Pro Arg Ala
325 330 335

Ala Thr Val Val Ala Arg Gly Pro Leu Lys Cys Val Lys Leu Asp Arg
340 345 350

Pro Arg Phe Glu Arg Val Leu Gly Pro Cys Ser Asp Ile Leu Lys Arg
355 360 365

Asn Ile Gln Gln Tyr Asn Ser Phe Val Ser Leu Ser Val
370 375 380

<210> 42

<211> 285
<212> PRT
<213> Escherichia coli

<400> 42

Met Asn Arg Leu Pro Asp Asp Tyr Asp Pro Tyr Ala Val Glu Glu Pro
1 5 10 15

Ser Asp Glu Glu Pro Ala Leu Ser Ser Ser Glu Asp Glu Val Asp Val
20 25 30

Leu Leu His Gly Thr Pro Asp Gln Lys Arg Lys Leu Ile Arg Glu Cys
35 40 45

Leu Thr Gly Glu Ser Glu Ser Ser Ser Glu Asp Glu Phe Glu Lys Glu
50 55 60

Met Glu Ala Glu Leu Asn Ser Thr Met Lys Thr Met Glu Asp Lys Leu
65 70 75 80

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

Ala Pro Thr Arg Tyr Tyr Asp Asp Ile Tyr Phe Asp Ser Asp Ser Glu
100 105 110

Asp Glu Asp Arg Ala Val Gln Val Thr Lys Lys Lys Lys Lys Lys Gln
115 120 125

His Lys Ile Pro Thr Asn Asp Glu Leu Leu Tyr Asp Pro Glu Lys Asp
130 135 140

Asn Arg Asp Gln Ala Trp Val Asp Ala Gln Arg Arg Gly Tyr His Gly
145 150 155 160

Leu Gly Pro Gln Arg Ser Arg Gln Gln Gln Pro Val Pro Asn Ser Asp
165 170 175

Ala Val Leu Asn Cys Pro Ala Cys Met Thr Thr Leu Cys Leu Asp Cys
180 185 190

Gln Arg His Glu Ser Tyr Lys Thr Gln Tyr Arg Ala Met Phe Val Met
195 200 205

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

Asn Arg Lys Lys Arg Arg Val His Lys Lys Met Arg Ser Asn Arg Glu
225 230 235 240

Asp Ala Ala Glu Lys Ala Glu Thr Asp Val Glu Glu Ile Tyr His Pro
245 250 255

Val Met Cys Thr Glu Cys Ser Thr Glu Val Ala Val Tyr Asp Lys Asp
260 265 270

Glu Val Phe His Phe Phe Asn Val Leu Ala Ser His Ser
275 280 285