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<110> Jennewein Biotechnologie GmbH

<120> Fermentative production of N-acetylneuraminic acid

<130> P 1705 WO

<150> EP 17196925.6

<151> 2017-10-17

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<170> PatentIn version 3.5

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35 40 45

Leu Gly Lys Val Gln Met Leu Ala Gln Ala Ala Glu Glu His Pro Leu
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His Gly Gly Thr Gly Ile Ala His Thr Arg Trp Ala Thr His Gly Glu
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Pro Ser Glu Val Asn Ala His Pro His Val Ser Glu His Ile Val Val
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Val His Asn Gly Ile Ile Glu Asn His Glu Pro Leu Arg Glu Glu Leu
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Lys Ala Arg Gly Tyr Thr Phe Val Ser Glu Thr Asp Thr Glu Val Ile
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Ala Val Leu Arg Ala Ile Pro Gln Leu Arg Gly Ala Tyr Gly Thr Val
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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> 12
<211> 1830
<212> DNA
<213> Escherichia coli

<400> 12
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ccgtctgagg tcaacgcaca cccgcatgtt agcgagcaca tcgtagtcgt tcacaacggt 300
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actctgcgtg aagcagttct gcgtgccatt ccacagctgc gtggtgcata cggtaccgtg 480
atcatggact ctctcatcc ggataccctg ctgcgcgcac gttctgggtc tccactcgtt 540
atcgggtctgg gtatgggtga gaacttcac gcctctgatc agctggccct gctcccagtt 600
accgctcgct tcatcttcct ggaagagggt gacatcgccg aaatcacccg tcgttccggt 660

aacatcttcg acaaaacggg tgcggaagtt aaacgtcagg acatcgagtc taacctgcag	720
tatgacgctg gtgacaaagg catctaccgt cactacatgc agaaagagat ctacgaacag	780
ccgaacgcga tcaaaaacac cctgaccggt cgtatctctc acgggtcaggt tgacctgtct	840
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tgtgggtacct cttacaactc cgggtatggtt tctcgttact gggtcgaatc tctggcaggt	960
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aactccctca tgatcacctt gtctcagtct ggtgaaaccg ctgatactct ggcaggtctg	1080
cgtctcagca aagaactggg ttacctgggt tctctggcca tctgcaacgt tccgggttct	1140
agcctgggtc gtgagtctgt gctggctctg atgaccaacg cgggtacgga gatcgggtgtt	1200
gcctctacca aagcgttcac taccagctc actgtcctgc tgatgctggt tgccaaactg	1260
tctcgctctca aaggcctcga cgctagcatc gaacacgaca tcgtacacgg tctgcaggcc	1320
ctcccatctc gtatcgagca gatgctgccg caggacaaac gtatcgaagc actggcagaa	1380
gacttcagcg acaaacacca cgcgctgttt ctgggtcgtg gtgaccagta cccaattgcg	1440
ctggaagggtg ccctgaaact gaaagagatc agctacatcc atgcagaggc atacgcagcg	1500
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cacatcatcg aaatgccgca tgttgaagag gtaatcgcgc caatcttcta caccgtaccg	1740
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<210> 13
 <211> 609
 <212> PRT
 <213> Escherichia coli

<400> 13

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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> 14
<211> 480
<212> DNA
<213> *Saccharomyces cerevisiae*

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actgagacgc taaaggtttt gaccaccgtg ggcactatta cccccgaatc cttcagcaaa 120
ctcataaaat actggaatga agccacagta tggaatgata acgaagataa aaaaataatg 180
caatataacc ccatggtgat tgtggacaag cgcaccgaga cggttgccgc tacggggaat 240
atcatcatcg aaagaaagat cattcatgaa ctggggctat gtggccacat cgaggacatt 300
gcagtaaaact ccaagtatca gggccaaggt ttgggcaagc tcttgattga tcaattggta 360
actatcgggt ttgactacgg ttgttataag attattttag attgcgatga gaaaaatgtc 420
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<210> 15
<211> 159
<212> PRT
<213> *Saccharomyces cerevisiae*

<400> 15

Met Ser Leu Pro Asp Gly Phe Tyr Ile Arg Arg Met Glu Glu Gly Asp
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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

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> 16

<211> 567

<212> DNA

<213> Escherichia coli

<400> 16

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 caggcgatga ttgcgcttaa tggatcgccc acctggcgta ttgctcaggc aattattgag 180
 ctgaatcagg ccgatctcga cccgcatgcy ttagcgcgty aaaaaacaga agcagtaaga 240
 agtatgctgc tggatagcgt cgaaccgctt cctcttggtg atgtggtgaa aagttggcat 300
 ggctcgtcgcc caatggctgt aggaacgggg agtgaaagcg ccatcgctga ggcattgctg 360
 gcgcacctgg gattacgcca ttattttgac gccgtcgctg ctgccgatca cgtcaaacac 420
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 gacgccgtgg atgttcgctt gctgtga 567

<210> 17

<211> 188

<212> PRT

<213> Escherichia coli

<400> 17

Met Tyr Glu Arg Tyr Ala Gly Leu Ile Phe Asp Met Asp Gly Thr Ile
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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> 18
<211> 600
<212> DNA
<213> Escherichia coli

<400> 18
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ggggaggcgt ttcacagca tgagcgtggg gaaattagcg acgaagcgtt cgcagaggcg 180
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acgggtctttt tcgacgataa cgccgataat atagaaggag ccaatcagct gggcattacc 540
agtattctgg tgaaagataa aaccaccatc ccggactatt tcgcgaaggt gttatgctaa 600

<210> 19
<211> 199
<212> PRT
<213> Escherichia coli

<400> 19

Met Leu Tyr Ile Phe Asp Leu Gly Asn Val Ile Val Asp Ile Asp Phe
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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
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<210> 20
<211> 1266
<212> DNA
<213> Bacteroides ovatus

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<400> 20
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gatgagctcc tggacaacgt ccttcctttc tggcttgaac attcacaaga ccatgagtat      180
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aatatattct cgtatacatt cgctaccatg gctttcggac agttgagcct tacaaccggt      480
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aatccgaaaag ggagatggaa taagcttcat ccgggtaccc gtaatctgaa gaactttgcc      600
ttgccaatga tcctctgtaa cttggcactg gagatagagc atttattgga tgaaacgtat      660
ctgcgggaaa caatggatac ttgtatccat gaagtgatgg aagttttcta tcgtcctgaa      720
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aattatggct gggacaagca atatggaggt atctactatt ttatggatcg taacggttgt      960
cctccccaac aattggagtg ggaccagaaa ctctggtggg tccatatcga aacgcttatt     1020
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gtacatgact acacttggga gcatttcaag gataaagaat atcctgaatg gtatggctac     1140
ttgaaccgaa gaggcgaagt attgctacca ctcaaaggag gaaaatggaa aggatgcttc     1200
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tcctaa                                           1266

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<210> 21
<211> 421
<212> PRT
<213> Bacteroides ovatus

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<400> 21

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Met Asp Ser Lys Asn Asn Ile Gly His Ser Ala Asp Ile Ser Leu Thr
1           5           10           15

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Ala Glu Leu Pro Ile Pro Ile Tyr Asn Gly Asn Thr Ile Met Asp Phe
          20           25           30

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Lys Lys Leu Ala Ser Leu Tyr Lys Asp Glu Leu Leu Asp Asn Val Leu
35           40           45

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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
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
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
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> 22
 <211> 1176
 <212> DNA
 <213> Synechocystis PCC6803

<400> 22
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 gcccgccatg gtgctgattt ttttagctcgc cacggccgag atcaagacgg taattggtat 300
 tttgcttttg atcaggaagg caaacccctg cgtcaaccct ataacgtttt ttccgattgc 360
 ttcgccgcca tggccttttag tcaatatgcc ttagccagtg gggcgcagga agctaaagcc 420
 attgccctgc aggctacaa taacgtccta cgccgtcagc acaatcccaa aggtcaatac 480
 gagaagtcct atccaggtac tagaccctc aaatccctgg cggtgccgat gatttttagcc 540
 aacctcacc tggagatgga atggttatta ccgcctacta ccgtggaaga ggtgttggcc 600
 caaacgtca gagaagtgat gacggatttc ctcgaccag aaataggatt aatgcgggaa 660
 gcggtgaccc ccacaggaga atttgttgat agttttgaag ggcggttgct caaccagga 720
 cacggcattg aagccatgtg gttcatgatg gacattgccc aacgctccgg cgatcgccag 780

ttacaggagc aagccattgc agtgggtgttg aacaccctgg aatatgcctg ggatgaagaa	840
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gaccaaagc tctgggtgggt acatttgga accctgggtg ccctagccaa gggccaccaa	960
gccactggcc aagaaaaatg ttggcaatgg tttgagcggg tccatgatta cgcctggagt	1020
catttcgccg atcctgagta tggggaatgg tttggctacc tgaatcgccg gggagagggtg	1080
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ctctgtgcgg aaactctcca acttccggtt agttaa	1176

<210> 23
 <211> 391
 <212> PRT
 <213> Synechocystis PCC6803

<400> 23

Met	Ile	Ala	His	Arg	Arg	Gln	Glu	Leu	Ala	Gln	Gln	Tyr	Tyr	Gln	Ala
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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> 24

<211> 708

<212> DNA

<213> Enterobacter cloacae

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ggggctgcgg ccatccgtgc caacagcgtg gtggatattg aggcgatcaa agagcaggtt 180
acgctgccgg ttattggcat catcaagcgg gagtaccccg acagcgaggt gtttatcacc 240
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gcgcaggcgc tgggggtttga ttgtgtcggg accacgcttt acggctacac cgcgcagacc 480
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acgggtaccgg tgggtggccga aggtaacgtg gacaccccg aacgcgccgc cagatgtctg 600
gcgttggggg cgcataatggt ggtggtgggc ggggcaatca cccgcccga gcagattacg 660
gaacgcttta tggcggaat tgacgcgcaa agcaccgatc gagcatga 708

<210> 25
<211> 235
<212> PRT
<213> Enterobacter cloacae

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

Met Ala Asp Ile Ala Thr Val Asp Glu Ala Val Thr Ala Gln Ala Leu
130 135 140

Gly Phe Asp Cys Val Gly Thr Thr Leu Tyr Gly Tyr Thr Ala Gln Thr
145 150 155 160

Val Gly His Ala Leu Pro Asp Asp Asp Cys Gln Phe Leu Lys Ala Val
165 170 175

Leu Ala Ala Val Thr Val Pro Val Val Ala Glu Gly Asn Val Asp Thr
180 185 190

Pro Glu Arg Ala Ala Arg Cys Leu Ala Leu Gly Ala His Met Val Val
195 200 205

Val Gly Gly Ala Ile Thr Arg Pro Gln Gln Ile Thr Glu Arg Phe Met
210 215 220

Ala Ala Ile Asp Ala Gln Ser Thr Asp Arg Ala
225 230 235

<210> 26
<211> 2652
<212> DNA
<213> Escherichia coli

<400> 26
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ttgtcgaaat cttcacgcgc tggcaatgat gctaaccgcc aggagttgct caccacctta 180
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ccggaagtga tcgcccgcac cctgcgtaaa ctgaaaaacc agccggaact gagcgaagac 360
accatcaaaa aagcagtgga atcgctgtcg ctggaactgg tcctcacggc tcaccaaac 420
gaaattacc gtcgtacact gatccacaaa atggtggaag tgaacgcctg tttaaaacag 480
ctcgataaca aagatatcgc tgactacgaa cacaaccagc tgatgcgtcg cctgcgccag 540
ttgatcgccc agtcatggca taccgatgaa atccgtaagc tgcgccaag cccggtagat 600
gaagccaaat ggggctttgc cgtagtgga aacagcctgt ggcaaggcgt accaaattac 660
ctgcgcgaac tgaacgaaca actggaagag aacctcggct acaaactgcc cgtcgaattt 720
gttccggtcc gttttacttc gtggatgggc ggcgaccgcg acggcaaccc gaacgtcact 780
gccgatatca cccgccacgt cctgctactc agccgctgga aagccaccga tttgttcctg 840
aaagatatc aggtgctggt ttctgaactg tcgatggttg aagcgacccc tgaactgctg 900

gcgctggttg gcgaagaagg tgccgcagaa ccgtatcgct atctgatgaa aaacctgcgt	960
tctcgctga tggcgacaca ggcatggctg gaagcgcgcc tgaaaggcga agaactgcc	1020
aaaccagaag gcctgctgac acaaaacgaa gaactgtggg aaccgctcta cgcttgctac	1080
cagtcacttc aggcgtgtgg catgggtatt atcgccaacg gcgatctgct cgacaccctg	1140
cgccgcgtga aatgtttcgg cgtaccgctg gtccgtattg atatccgtca ggagagcacg	1200
cgtcataccg aagcgtggg cgagctgacc cgctacctcg gtatcggcga ctacgaaagc	1260
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gccaacctgc tgccaccgcc ggagccgaaa gagagctggc gtcgcattat ggatgaactg	1980
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gatctgccgt ggattgcaga gtctattcag ctacggaata ttacaccga cccgctgaac	2520
gtattgcagg ccgagttgct gcaccgctcc cgccaggcag aaaaagaagg ccaggaaccg	2580
gacctcgcg tcgaacaagc gttaatggtc actattgccg ggattgcggc aggtatgcgt	2640
aataccggct aa	2652

<210> 27
<211> 883

<212> PRT

<213> Escherichia coli

<400> 27

Met Asn Glu Gln Tyr Ser Ala Leu Arg Ser Asn Val Ser Met Leu Gly
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Lys Val Leu Gly Glu Thr Ile Lys Asp Ala Leu Gly Glu His Ile Leu
20 25 30

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

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

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

Leu Ala Asn Thr Ala Glu Gln Tyr His Ser Ile Ser Pro Lys Gly Glu
85 90 95

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

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

Leu Ser Leu Glu Leu Val Leu Thr Ala His Pro Thr Glu Ile Thr Arg
130 135 140

Arg Thr Leu Ile His Lys Met Val Glu Val Asn Ala Cys Leu Lys Gln
145 150 155 160

Leu Asp Asn Lys Asp Ile Ala Asp Tyr Glu His Asn Gln Leu Met Arg
165 170 175

Arg Leu Arg Gln Leu Ile Ala Gln Ser Trp His Thr Asp Glu Ile Arg
180 185 190

Lys Leu Arg Pro Ser Pro Val Asp Glu Ala Lys Trp Gly Phe Ala Val
195 200 205

Val Glu Asn Ser Leu Trp Gln Gly Val Pro Asn Tyr Leu Arg Glu Leu
210 215 220

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

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

Phe	Ala	Met	Pro	Val	Ala	Pro	Leu	Phe	Glu	Thr	Leu	Asp	Asp	Leu	Asn	500	505	510
Asn	Ala	Asn	Asp	Val	Met	Thr	Gln	Leu	Leu	Asn	Ile	Asp	Trp	Tyr	Arg	515	520	525
Gly	Leu	Ile	Gln	Gly	Lys	Gln	Met	Val	Met	Ile	Gly	Tyr	Ser	Asp	Ser	530	535	540
Ala	Lys	Asp	Ala	Gly	Val	Met	Ala	Ala	Ser	Trp	Ala	Gln	Tyr	Gln	Ala	545	550	555
Gln	Asp	Ala	Leu	Ile	Lys	Thr	Cys	Glu	Lys	Ala	Gly	Ile	Glu	Leu	Thr	565	570	575
Leu	Phe	His	Gly	Arg	Gly	Gly	Ser	Ile	Gly	Arg	Gly	Gly	Ala	Pro	Ala	580	585	590
His	Ala	Ala	Leu	Leu	Ser	Gln	Pro	Pro	Gly	Ser	Leu	Lys	Gly	Gly	Leu	595	600	605
Arg	Val	Thr	Glu	Gln	Gly	Glu	Met	Ile	Arg	Phe	Lys	Tyr	Gly	Leu	Pro	610	615	620
Glu	Ile	Thr	Val	Ser	Ser	Leu	Ser	Leu	Tyr	Thr	Gly	Ala	Ile	Leu	Glu	625	630	635
Ala	Asn	Leu	Leu	Pro	Pro	Pro	Glu	Pro	Lys	Glu	Ser	Trp	Arg	Arg	Ile	645	650	655
Met	Asp	Glu	Leu	Ser	Val	Ile	Ser	Cys	Asp	Val	Tyr	Arg	Gly	Tyr	Val	660	665	670
Arg	Glu	Asn	Lys	Asp	Phe	Val	Pro	Tyr	Phe	Arg	Ser	Ala	Thr	Pro	Glu	675	680	685
Gln	Glu	Leu	Gly	Lys	Leu	Pro	Leu	Gly	Ser	Arg	Pro	Ala	Lys	Arg	Arg	690	695	700
Pro	Thr	Gly	Gly	Val	Glu	Ser	Leu	Arg	Ala	Ile	Pro	Trp	Ile	Phe	Ala	705	710	715
Trp	Thr	Gln	Asn	Arg	Leu	Met	Leu	Pro	Ala	Trp	Leu	Gly	Ala	Gly	Thr	725	730	735
Ala	Leu	Gln	Lys	Val	Val	Glu	Asp	Gly	Lys	Gln	Ser	Glu	Leu	Glu	Ala	740	745	750

Met Cys Arg Asp Trp Pro Phe Phe Ser Thr Arg Leu Gly Met Leu Glu
755 760 765

Met Val Phe Ala Lys Ala Asp Leu Trp Leu Ala Glu Tyr Tyr Asp Gln
770 775 780

Arg Leu Val Asp Lys Ala Leu Trp Pro Leu Gly Lys Glu Leu Arg Asn
785 790 795 800

Leu Gln Glu Glu Asp Ile Lys Val Val Leu Ala Ile Ala Asn Asp Ser
805 810 815

His Leu Met Ala Asp Leu Pro Trp Ile Ala Glu Ser Ile Gln Leu Arg
820 825 830

Asn Ile Tyr Thr Asp Pro Leu Asn Val Leu Gln Ala Glu Leu Leu His
835 840 845

Arg Ser Arg Gln Ala Glu Lys Glu Gly Gln Glu Pro Asp Pro Arg Val
850 855 860

Glu Gln Ala Leu Met Val Thr Ile Ala Gly Ile Ala Ala Gly Met Arg
865 870 875 880

Asn Thr Gly

<210> 28
<211> 1041
<212> DNA
<213> Campylobacter jejuni

<400> 28
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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
gggtcttggtt atcttagcac acctttttct cgtgcaggtg caaaccgctt agaagatatg 360
ggagtttagtg cttttaagat tggttcaggt gagtgttaata attatccgct tattaacac 420
atagcagcct ttaaaaagcc tatgatagtt agcacaggaa tgaatagtat tgaaagtata 480
aaaccaactg taaaaatctt attagacaat gaaattccct ttgttttaat gcactcgacc 540
aatctttacc caaccccgca taatcttgta agattaaacg ctatgcttga attaaaaaaa 600
gaattttctt gcatggtagg cttaagcgac cacacaacag ataatcttgc gtgttttaggt 660

gcggttgac ttggtgcttg tgtgcttgaa agacatttta ctgatagtat gcatagaagt 720
ggccctgata tagtttgctt tatggataca aaggctttta aagagctaata tatccaaagt 780
gagcaaattg ctataatgaa aggaataat 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

<210> 29
<211> 346
<212> PRT
<213> Campylobacter jejuni

<400> 29

Met Lys Glu Ile Lys Ile Gln Asn Ile Ile Ile Ser Glu Glu Lys Ala
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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 Ser 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 Ala 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 Met Lys 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 Thr Gln Leu Ser Tyr Glu Asp Phe Ala
 340 345

<210> 30

<211> 876

<212> DNA

<213> Escherichia coli

<400> 30

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ttgcgtgatg ccttatccgc attagtctct ccgttgcaag ctcatgcgca gcggggttgcc 180

atcgcttcga ccgggataat ccgtgacggc agcttgctgg cgcttaatcc gcataatctt 240

ggtggttgatg tacactttcc gttagtcaaa acgctggaac aacttaccaa tttgccgacc 300

attgccatta acgacgcgca ggccgcagca tgggcggagt ttcaggcgct ggatggcgat 360

ataaccgata	tggtctttat	caccgtttcc	accggcggtg	gcggcggtgt	agtgagcggc	420
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ccacacggcc	cagtctgcgg	ctgtggacgc	acaggttgcg	tggaagcgat	tgcttctggt	540
cgcggcattg	cagcggcagc	gcagggggag	ttggctggcg	cggatgcgaa	aactattttc	600
acgcgcgccg	ggcaggggtga	cgagcaggcg	cagcagctga	ttcaccgctc	cgcacgtacg	660
cttgcaaggc	tgatcgctga	tattaaagcc	acaactgatt	gccagtgcgt	ggtggtcggt	720
ggcagcgttg	gtctggcaga	agggatatctg	gcgctggtgg	aaacgtatct	ggcgcaggag	780
ccagcggcat	ttcatgttga	tttactggcg	gcgcattacc	gccatgatgc	aggtttactt	840
ggggctgcgc	tgttggccca	gggagaaaaa	ttatga			876

<210> 31
 <211> 291
 <212> PRT
 <213> Escherichia coli

<400> 31

Met	Thr	Thr	Leu	Ala	Ile	Asp	Ile	Gly	Gly	Thr	Lys	Leu	Ala	Ala	Ala
1				5					10					15	

Leu	Ile	Gly	Ala	Asp	Gly	Gln	Ile	Arg	Asp	Arg	Arg	Glu	Leu	Pro	Thr
			20					25					30		

Pro	Ala	Ser	Gln	Thr	Pro	Glu	Ala	Leu	Arg	Asp	Ala	Leu	Ser	Ala	Leu
		35					40					45			

Val	Ser	Pro	Leu	Gln	Ala	His	Ala	Gln	Arg	Val	Ala	Ile	Ala	Ser	Thr
50						55					60				

Gly	Ile	Ile	Arg	Asp	Gly	Ser	Leu	Leu	Ala	Leu	Asn	Pro	His	Asn	Leu
65					70					75					80

Gly	Gly	Leu	Leu	His	Phe	Pro	Leu	Val	Lys	Thr	Leu	Glu	Gln	Leu	Thr
				85					90					95	

Asn	Leu	Pro	Thr	Ile	Ala	Ile	Asn	Asp	Ala	Gln	Ala	Ala	Ala	Trp	Ala
			100					105						110	

Glu	Phe	Gln	Ala	Leu	Asp	Gly	Asp	Ile	Thr	Asp	Met	Val	Phe	Ile	Thr
		115					120					125			

Val	Ser	Thr	Gly	Val	Gly	Gly	Gly	Val	Val	Ser	Gly	Cys	Lys	Leu	Leu
130						135					140				

Thr Gly Pro Gly Gly Leu Ala Gly His Ile Gly His Thr Leu Ala Asp

145		150		155		160
Pro His Gly Pro Val Cys Gly Cys Gly Arg Thr Gly Cys Val Glu Ala						
		165		170		175
Ile Ala Ser Gly Arg Gly Ile Ala Ala Ala Ala Gln Gly Glu Leu Ala						
		180		185		190
Gly Ala Asp Ala Lys Thr Ile Phe Thr Arg Ala Gly Gln Gly Asp Glu						
		195		200		205
Gln Ala Gln Gln Leu Ile His Arg Ser Ala Arg Thr Leu Ala Arg Leu						
		210		215		220
Ile Ala Asp Ile Lys Ala Thr Thr Asp Cys Gln Cys Val Val Val Gly						
225		230		235		240
Gly Ser Val Gly Leu Ala Glu Gly Tyr Leu Ala Leu Val Glu Thr Tyr						
		245		250		255
Leu Ala Gln Glu Pro Ala Ala Phe His Val Asp Leu Leu Ala Ala His						
		260		265		270
Tyr Arg His Asp Ala Gly Leu Leu Gly Ala Ala Leu Leu Ala Gln Gly						
		275		280		285
Glu Lys Leu						
		290				

<210> 32
 <211> 690
 <212> DNA
 <213> Escherichia coli

<400> 32	
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gcggcagaac aggcgggccc ggttgccatt cgcattgaag gtgtggcaaa tctgcaagcc	180
acgcgtgcgg tggtagagcgt gccgattatt ggaattgtga aacgcgatct ggaggattct	240
ccggtacgca tcacggccta tattgaagat gttgatgcgc tggcgcaggc gggcgcggac	300
attatcgcca ttgacggcac cgaccgcccg cgtccggtgc ctggtgaaac gctgctggca	360
cgtattcacc atcacggttt actggcgatg accgactgct caacgccgga agacggcctg	420
gcatgccaaa agctgggagc cgaaattatt ggcaactacgc tttctggcta taccacgcct	480
gaaacgccag aagagccgga tctggcgctg gtgaaaacgt tgagcgacgc cggatgtcgg	540
gtgattgccg aagggcggtta caacacgcct gctcaggcgg cggatgcgat gcgccacggc	600

gcgtgggcg tgacggtcgg ttctgcaatc acgcgtcttg agcacatttg tcagtgggtac 660

aacacagcga tgaaaaaggc ggtgctatga 690

<210> 33

<211> 229

<212> PRT

<213> Escherichia coli

<400> 33

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

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> 34
 <211> 894
 <212> DNA
 <213> Escherichia coli

<400> 34
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 gggtttatacg tgggtgggttc gaccggcgag gcctttgtac aaagcctttc cgagcgtgaa 180
 caggtactgg aaatcgtcgc cgaagaggcg aaaggtaaga ttaaactcat cgcccacgtc 240
 gggttgcgtca gcaccgccga aagccaacaa cttgcggcat cggctaaacg ttatggcttc 300
 gatgccgtct ccgccgtcac gccgttctac tatcctttca gctttgaaga aactgcgat 360
 cactatcggg caattattga ttcggcggat gggttgccga tgggtggtga caacattcca 420
 gccctgagtg gggtaaaact gaccctggat cagatcaaca cacttgttac attgcctggc 480
 gtaggtgcgc tgaaacagac ctctggcgat ctctatcaga tggagcagat ccgtcgtgaa 540
 catcctgatc ttgtgctcta taacggttac gacgaaatct tcgcctctgg tctgctggcg 600
 ggcgctgatg gtggtatcgg cagtacctac aacatcatgg gctggcgcta tcaggggatc 660
 gttaaggcgc tgaaagaagg cgatatccag accgcgcaga aactgcaaac tgaatgcaat 720
 aaagtcattg atttactgat caaaacgggc gtattccgcg gcctgaaaac tgtcctccat 780
 tatatggatg tcgtttctgt gccgctgtgc cgcaaaccgt ttggaccggt agatgaaaaa 840
 tatctgccag aactgaaggc gctggcccag cagttgatgc aagagcgcgg gtga 894

<210> 35
 <211> 297
 <212> PRT
 <213> Escherichia coli

<400> 35

Met Ala Thr Asn Leu Arg Gly Val Met Ala Ala Leu Leu Thr Pro Phe
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Asp Gln Gln Gln Ala Leu Asp Lys Ala Ser Leu Arg Arg Leu Val Gln
 20 25 30

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

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

Ile Val Ala Glu Glu Ala Lys Gly Lys Ile Lys Leu Ile Ala His Val
 65 70 75 80

Gly Cys Val Ser Thr Ala Glu Ser Gln Gln Leu Ala Ala Ser Ala Lys
 85 90 95

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

Phe Ser Phe Glu Glu His Cys Asp His Tyr Arg Ala Ile Ile Asp Ser
 115 120 125

Ala Asp Gly Leu Pro Met Val Val Tyr Asn Ile Pro Ala Leu Ser Gly
 130 135 140

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

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

Ile Arg Arg Glu His Pro Asp Leu Val Leu Tyr Asn Gly Tyr Asp Glu
 180 185 190

Ile Phe Ala Ser Gly Leu Leu Ala Gly Ala Asp Gly Gly Ile Gly Ser
 195 200 205

Thr Tyr Asn Ile Met Gly Trp Arg Tyr Gln Gly Ile Val Lys Ala Leu
 210 215 220

Lys Glu Gly Asp Ile Gln Thr Ala Gln Lys Leu Gln Thr Glu Cys Asn
 225 230 235 240

Lys Val Ile Asp Leu Leu Ile Lys Thr Gly Val Phe Arg Gly Leu Lys
 245 250 255

Thr Val Leu His Tyr Met Asp Val Val Ser Val Pro Leu Cys Arg Lys
 260 265 270

Pro Phe Gly Pro Val Asp Glu Lys Tyr Leu Pro Glu Leu Lys Ala Leu
 275 280 285

Ala Gln Gln Leu Met Gln Glu Arg Gly
 290 295

<210> 36
<211> 1491
<212> DNA
<213> Escherichia coli

<400> 36
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ctggtactca ccgaagtaca aggtgaattc gggctgacga cggcgcaggc ggcaagtctg 180
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ctgcgtaaca aagccagtgg ttttttgatt tcaggcttct ctgtgggggc cgctcgttgcc 480
gctcagggtc atagcctggg gggtccggtc tggggctggc gtgcgctgtt ctttatcggc 540
attttgccaa tcatctttgc tctctggctg cgtaaaaaca tcccggaagc ggaagactgg 600
aaagagaaac acgcaggtaa agcaccagta cgcacaatgg tggatattct ctaccgtggg 660
gaacatcgca ttgccaatat cgtaatgaca ctggcggcgg ctactgcgct gtggttctgc 720
ttcgccggta acctgcaaaa tgccgcgacg gtcgctgttc ttgggctgtt atgcgcgcga 780
atctttatca gctttatggg gcagagtgcg ggcaaacgct ggccaacggg cgtaatgctg 840
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tatctgaaaa ccgatctggc ttataacccg catactgtag ccaatgtgct gttctttagt 960
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cgcaaagcgt acgtttgtag cctgctggcc tcgcagctgc tgattattcc ggtatttgcg 1080
attggcggcg caaacgtctg ggtgctcggg ctgttactgt tcttccagca aatgcttgga 1140
caagggatcg ccgggatctt accaaaactg attggcgggt atttcgatac cgaccagcgt 1200
gcagcgggcc tgggctttac ctacaacgtt ggcgcattgg gcggtgcact ggccccaatc 1260
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agtctgacgt tcgtgggtgat cctgctgatt gggctggata tgccttctcg cgttcagcgt 1380
tggttgcgcc cggaagcgtt gcgtactcat gacgctatcg acggtaaacc attcagcggg 1440
gccgtgccgt ttggcagcgc caaaaacgat ttagtcaaaa ccaaaagtta a 1491

<210> 37
<211> 496
<212> PRT
<213> Escherichia coli

<400> 37

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

Leu Cys Ala Ala Ile Phe Ile Ser Phe Met Val Gln Ser Ala Gly Lys
 260 265 270
 Arg Trp Pro Thr Gly Val Met Leu Met Val Val Val Leu Phe Ala Phe
 275 280 285
 Leu Tyr Ser Trp Pro Ile Gln Ala Leu Leu Pro Thr Tyr Leu Lys Thr
 290 295 300
 Asp Leu Ala Tyr Asn Pro His Thr Val Ala Asn Val Leu Phe Phe Ser
 305 310 315 320
 Gly Phe Gly Ala Ala Val Gly Cys Cys Val Gly Gly Phe Leu Gly Asp
 325 330 335
 Trp Leu Gly Thr Arg Lys Ala Tyr Val Cys Ser Leu Leu Ala Ser Gln
 340 345 350
 Leu Leu Ile Ile Pro Val Phe Ala Ile Gly Gly Ala Asn Val Trp Val
 355 360 365
 Leu Gly Leu Leu Leu Phe Phe Gln Gln Met Leu Gly Gln Gly Ile Ala
 370 375 380
 Gly Ile Leu Pro Lys Leu Ile Gly Gly Tyr Phe Asp Thr Asp Gln Arg
 385 390 395 400
 Ala Ala Gly Leu Gly Phe Thr Tyr Asn Val Gly Ala Leu Gly Gly Ala
 405 410 415
 Leu Ala Pro Ile Ile Gly Ala Leu Ile Ala Gln Arg Leu Asp Leu Gly
 420 425 430
 Thr Ala Leu Ala Ser Leu Ser Phe Ser Leu Thr Phe Val Val Ile Leu
 435 440 445
 Leu Ile Gly Leu Asp Met Pro Ser Arg Val Gln Arg Trp Leu Arg Pro
 450 455 460
 Glu Ala Leu Arg Thr His Asp Ala Ile Asp Gly Lys Pro Phe Ser Gly
 465 470 475 480
 Ala Val Pro Phe Gly Ser Ala Lys Asn Asp Leu Val Lys Thr Lys Ser
 485 490 495

<210> 38
 <211> 1149
 <212> DNA

<213> Escherichia coli

<400> 38

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atcgaacaac gttcactgaa cggggccatt ctctcccccg gttttatcga tgtgcagtta      180
aacggctgcg gcggcgtaga gtttaacgac accgctgaag cggtcagcgt ggaaacgctg      240
gaaatcatgc agaaagccaa tgagaaatca ggctgtacta actatctgcc gacgcttata      300
accaccagcg atgagctgat gaaacagggc gtgcgcgtta tgcgcgagta cctggcaaaa      360
catccgaatc aggcgttagg tctgcatctg gaagggtccgt ggctgaatct ggtaaaaaaa      420
ggcacccata atccgaatth tgtgcgtaag cctgatgccg cgctggtcga tttcctgtgt      480
gaaaacgccg acgtcattac caaagtgacc ctggcaccgg aaatggttcc tgcggaagtc      540
atcagcaaac tggcaaatgc cgggattgtg gtttctgccg gtcactccaa cgcgacgttg      600
aaagaagcaa aagccggtth ccgcgcgggg attacctttg ccacccatct gtacaacgcg      660
atgccgtata ttaccggtcg tgaacctggc ctggcggggc cgatcctcga cgaagctgac      720
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aaacgtctga aaggcgacaa actgtgtctg gttactgacg ccaccgcgcc agcaggtgcc      840
aacattgaac agttcattth tgcgggtaaa acaatatact accgtaacgg actttgtgtg      900
gatgagaacg gtacgttaag cggttcatcc ttaaccatga ttgaaggcgt gcgtaatctg      960
gtcgaacatt gcggtatcgc actggatgaa gtgctacgta tggcgacgct ctatccggcg      1020
cgtgcgattg gcgttgagaa acgtctcggc aactcgcgcg caggtaaagt agccaacctg      1080
actgcattca cacctgattt taaaatcacc aagaccatcg ttaacggtaa cgaggtcgta      1140
actcaataa                                     1149
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<210> 39

<211> 382

<212> PRT

<213> Escherichia coli

<400> 39

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

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Ala Ile Leu Ser Pro Gly Phe Ile Asp Val Gln Leu Asn Gly Cys Gly
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50

55

60

Gly Val Gln Phe Asn Asp Thr Ala Glu Ala Val Ser Val Glu Thr Leu
65 70 75 80

Glu Ile Met Gln Lys Ala Asn Glu Lys Ser Gly Cys Thr Asn Tyr Leu
85 90 95

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

Val Met Arg Glu Tyr Leu Ala Lys His Pro Asn Gln Ala Leu Gly Leu
115 120 125

His Leu Glu Gly Pro Trp Leu Asn Leu Val Lys Lys Gly Thr His Asn
130 135 140

Pro Asn Phe Val Arg Lys Pro Asp Ala Ala Leu Val Asp Phe Leu Cys
145 150 155 160

Glu Asn Ala Asp Val Ile Thr Lys Val Thr Leu Ala Pro Glu Met Val
165 170 175

Pro Ala Glu Val Ile Ser Lys Leu Ala Asn Ala Gly Ile Val Val Ser
180 185 190

Ala Gly His Ser Asn Ala Thr Leu Lys Glu Ala Lys Ala Gly Phe Arg
195 200 205

Ala Gly Ile Thr Phe Ala Thr His Leu Tyr Asn Ala Met Pro Tyr Ile
210 215 220

Thr Gly Arg Glu Pro Gly Leu Ala Gly Ala Ile Leu Asp Glu Ala Asp
225 230 235 240

Ile Tyr Cys Gly Ile Ile Ala Asp Gly Leu His Val Asp Tyr Ala Asn
245 250 255

Ile Arg Asn Ala Lys Arg Leu Lys Gly Asp Lys Leu Cys Leu Val Thr
260 265 270

Asp Ala Thr Ala Pro Ala Gly Ala Asn Ile Glu Gln Phe Ile Phe Ala
275 280 285

Gly Lys Thr Ile Tyr Tyr Arg Asn Gly Leu Cys Val Asp Glu Asn Gly
290 295 300

Thr Leu Ser Gly Ser Ser Leu Thr Met Ile Glu Gly Val Arg Asn Leu

305 310 315 320

Val Glu His Cys Gly Ile Ala Leu Asp Glu Val Leu Arg Met Ala Thr
325 330 335

Leu Tyr Pro Ala Arg Ala Ile Gly Val Glu Lys Arg Leu Gly Thr Leu
340 345 350

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

Ile Thr Lys Thr Ile Val Asn Gly Asn Glu Val Val Thr Gln
370 375 380

<210> 40

<211> 801

<212> DNA

<213> Escherichia coli

<400> 40

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actggcggca cgccgatgac cacctataaa gcgttagtcg aaatgcataa agcaggccag	180
gtcagcttta agcacgttgt caccttcaac atggacgaat atgtcgggtct gccgaaagag	240
catccggaaa gctactacag ctttatgcac cgtaatttct tcgatcacgt tgatattcca	300
gcagaaaaca tcaaccttct caacggcaac gccccggata tcgacgccga gtgccgccag	360
tatgaagaaa aaatccgttc ttacggaaaa attcatctgt ttatgggcgg tgtaggtaac	420
gacggtcata ttgcatttaa cgaaccggcg tcttctctgg cttctcgtac tcgtatcaaa	480
accctgactc atgacactcg cgtcgcaaac tctcgtttct ttgataacga tgттаатсag	540
gtgccaaaat atgccctgac tgtcgggtgtt ggtacactgc tggatgccga agaagtgatg	600
attctggtgc tgggtagcca gaaagcactg gcgctgcagg ccgccgttga aggttgcggtg	660
aaccatatgt ggaccatcag ctgtctgcaa ctgcatccga aagcgatcat ggtgtgcgat	720
gaaccttcca ccatggagct gaaagttaag actttaagat atttcaatga attagaagca	780
gaaaatatca aaggtctgta a	801

<210> 41

<211> 266

<212> PRT

<213> Escherichia coli

<400> 41

Met Arg Leu Ile Pro Leu Thr Thr Ala Glu Gln Val Gly Lys Trp Ala
1 5 10 15

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

<210> 42
<211> 1947
<212> DNA
<213> Escherichia coli

<400> 42
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attgcccagg cgggcggtgc gatttttgat aacctcgcat taatcttcgc catcggtgtg 180
gcatccagct ggtcgaaaga cagcgctggt gcggcgggcg tggcggggtg ggtaggttac 240
tttgtgttaa ccaaagcgat ggtgaccatc aaccagaaa ttaacatggg tgtactggcg 300
ggatatatta ccggtctggt tgggtggcgca gcctataacc gttggtccga tattaactg 360
ccggacttcc tgagcttctt cggcgggcaa cgctttgtgc cgattgccac cggattcttc 420
tgcttggtgc tggcgggccat ttttggttac gtctggccgc cggtagagca cgctatccat 480
gcaggcgggc agtggatcgt ttctgcgggc gcgctgggtt ccggtatctt tggtttcac 540
aaccgtctgc tgatcccaac cggctctgat caggtagtga acaccatcgc ctggttccag 600
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gccggtgacg gcaccgcggg gatgttcacg tccggcttct tcccgatcat gatgttcggt 720
ctgccgggtg cggcgctggc gatgtacttc gcagcaccga aagagcgtcg tccgatggtt 780
ggcggtatgc tgctttctgt tgctgttact gcgttcctga ccggtgtgac tgagccgctg 840
gaattcctgt tcatgttctt tgctccgctg ctgtacctcc tgcacgcact gctgaccggt 900
atcagcctgt ttgtggcaac gctgctgggt atccacgcgg gcttctcttt ctctgcgggg 960
gctatcgact acgcgttgat gtataacctg ccggccgcca gccagaacgt ctggatgctg 1020
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ggcggcactg acaacctgaa agcgattgac gcctgtatca ccgctctgcg cttacagtg 1260
gctgactctg cccgcgttaa cgatacgatg tgtaaacgtc tgggtgcttc tggggtagt 1320
aaactgaaca aacagactat tcagggtgatt gttggcgcg aagcagaatc catcggcgat 1380
gcgatgaaga aagtcgttgc ccgtggtccg gtagccgctg cgtcagctga agcaactccg 1440
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gccagcaaag cgggtgggtga cgggtgtggc gtgaaaccga cagataaaaat cgtcgtatca 1620
ccagccgcag ggacaatcgt gaaaatcttc aacaccaacc acgcgttctg cctggaaaacc 1680
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 atggatctgg attacctgaa cgtaacgcc cgctcgatga ttagcccggg ggtttgcagc 1860
 aatatcgacg atttcagtgg cttgatcatt aaagctcagg gccatattgt ggcgggtcaa 1920
 acaccgctgt atgaaatcaa aaagtaa 1947

<210> 43
 <211> 648
 <212> PRT
 <213> Escherichia coli

<400> 43

Met Asn Ile Leu Gly Phe Phe Gln Arg Leu Gly Arg Ala Leu Gln Leu
 1 5 10 15

Pro Ile Ala Val Leu Pro Val Ala Ala Leu Leu Leu Arg Phe Gly Gln
 20 25 30

Pro Asp Leu Leu Asn Val Ala Phe Ile Ala Gln Ala Gly Gly Ala Ile
 35 40 45

Phe Asp Asn Leu Ala Leu Ile Phe Ala Ile Gly Val Ala Ser Ser Trp
 50 55 60

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

Phe Val Leu Thr Lys Ala Met Val Thr Ile Asn Pro Glu Ile Asn Met
 85 90 95

Gly Val Leu Ala Gly Ile Ile Thr Gly Leu Val Gly Gly Ala Ala Tyr
 100 105 110

Asn Arg Trp Ser Asp Ile Lys Leu Pro Asp Phe Leu Ser Phe Phe Gly
 115 120 125

Gly Lys Arg Phe Val Pro Ile Ala Thr Gly Phe Phe Cys Leu Val Leu
 130 135 140

Ala Ala Ile Phe Gly Tyr Val Trp Pro Pro Val Gln His Ala Ile His
 145 150 155 160

Ala Gly Gly Glu Trp Ile Val Ser Ala Gly Ala Leu Gly Ser Gly Ile
 165 170 175

Phe Gly Phe Ile Asn Arg Leu Leu Ile Pro Thr Gly Leu His Gln Val
 180 185 190

Leu	Asn	Thr	Ile	Ala	Trp	Phe	Gln	Ile	Gly	Glu	Phe	Thr	Asn	Ala	Ala	195	200	205	
Gly	Thr	Val	Phe	His	Gly	Asp	Ile	Asn	Arg	Phe	Tyr	Ala	Gly	Asp	Gly	210	215	220	
Thr	Ala	Gly	Met	Phe	Met	Ser	Gly	Phe	Phe	Pro	Ile	Met	Met	Phe	Gly	225	230	235	240
Leu	Pro	Gly	Ala	Ala	Leu	Ala	Met	Tyr	Phe	Ala	Ala	Pro	Lys	Glu	Arg	245	250	255	
Arg	Pro	Met	Val	Gly	Gly	Met	Leu	Leu	Ser	Val	Ala	Val	Thr	Ala	Phe	260	265	270	
Leu	Thr	Gly	Val	Thr	Glu	Pro	Leu	Glu	Phe	Leu	Phe	Met	Phe	Leu	Ala	275	280	285	
Pro	Leu	Leu	Tyr	Leu	Leu	His	Ala	Leu	Leu	Thr	Gly	Ile	Ser	Leu	Phe	290	295	300	
Val	Ala	Thr	Leu	Leu	Gly	Ile	His	Ala	Gly	Phe	Ser	Phe	Ser	Ala	Gly	305	310	315	320
Ala	Ile	Asp	Tyr	Ala	Leu	Met	Tyr	Asn	Leu	Pro	Ala	Ala	Ser	Gln	Asn	325	330	335	
Val	Trp	Met	Leu	Leu	Val	Met	Gly	Val	Ile	Phe	Phe	Ala	Ile	Tyr	Phe	340	345	350	
Val	Val	Phe	Ser	Leu	Val	Ile	Arg	Met	Phe	Asn	Leu	Lys	Thr	Pro	Gly	355	360	365	
Arg	Glu	Asp	Lys	Glu	Asp	Glu	Ile	Val	Thr	Glu	Glu	Ala	Asn	Ser	Asn	370	375	380	
Thr	Glu	Glu	Gly	Leu	Thr	Gln	Leu	Ala	Thr	Asn	Tyr	Ile	Ala	Ala	Val	385	390	395	400
Gly	Gly	Thr	Asp	Asn	Leu	Lys	Ala	Ile	Asp	Ala	Cys	Ile	Thr	Arg	Leu	405	410	415	
Arg	Leu	Thr	Val	Ala	Asp	Ser	Ala	Arg	Val	Asn	Asp	Thr	Met	Cys	Lys	420	425	430	
Arg	Leu	Gly	Ala	Ser	Gly	Val	Val	Lys	Leu	Asn	Lys	Gln	Thr	Ile	Gln	435	440	445	

Val Ile Val Gly Ala Lys Ala Glu Ser Ile Gly Asp Ala Met Lys Lys
 450 455 460
 Val Val Ala Arg Gly Pro Val Ala Ala Ala Ser Ala Glu Ala Thr Pro
 465 470 475 480
 Ala Thr Ala Ala Pro Val Ala Lys Pro Gln Ala Val Pro Asn Ala Val
 485 490 495
 Ser Ile Ala Glu Leu Val Ser Pro Ile Thr Gly Asp Val Val Ala Leu
 500 505 510
 Asp Gln Val Pro Asp Glu Ala Phe Ala Ser Lys Ala Val Gly Asp Gly
 515 520 525
 Val Ala Val Lys Pro Thr Asp Lys Ile Val Val Ser Pro Ala Ala Gly
 530 535 540
 Thr Ile Val Lys Ile Phe Asn Thr Asn His Ala Phe Cys Leu Glu Thr
 545 550 555 560
 Glu Lys Gly Ala Glu Ile Val Val His Met Gly Ile Asp Thr Val Ala
 565 570 575
 Leu Glu Gly Lys Gly Phe Lys Arg Leu Val Glu Glu Gly Ala Gln Val
 580 585 590
 Ser Ala Gly Gln Pro Ile Leu Glu Met Asp Leu Asp Tyr Leu Asn Ala
 595 600 605
 Asn Ala Arg Ser Met Ile Ser Pro Val Val Cys Ser Asn Ile Asp Asp
 610 615 620
 Phe Ser Gly Leu Ile Ile Lys Ala Gln Gly His Ile Val Ala Gly Gln
 625 630 635 640
 Thr Pro Leu Tyr Glu Ile Lys Lys
 645

<210> 44
 <211> 972
 <212> DNA
 <213> Escherichia coli

<400> 44
 atgaccattg ctattgttat aggcacacat gggtgggctg cagagcagtt gcttaaaacg 60
 gcagaaatgc tgttaggcga gcaggaaaac gtcggctgga tcgatttcgt tccaggtgaa 120
 aatgccgaaa cgctgattga aaagtacaac gctcagttgg caaaactcga caccactaaa 180

```

ggcgtgctgt ttctcgttga tacatgggga ggcagcccgt tcaatgctgc cagccgcatt      240
gtcgtcgaca aagagcatta tgaagtcatt gcaggcggtta acattccaat gctcgtggaa      300
acgttaatgg cccgtgatga tgacccaagc tttgatgaac tgggtggcact ggcagtagaa      360
acaggccctg aaggcgtgaa agcactgaaa gccaaaccgg ttgaaaaagc cgcgccagca      420
cccgtgcccg cagcaccaaa agcgggtcca actccggcaa aaccaatggg gccaaacgac      480
tacatggtta ttggccttgc gcgtatcgac gaccgtctga ttcacggtca ggtcgccacc      540
cgctggacca aagaaaccaa tgtctcccgt attattgttg ttagtgatga agtggctgcg      600
gataccgttc gtaagacact gctcaccag gttgcacctc cgggcgtaac agcacacgta      660
gttgatgttg ccaaaatgat tcgcgtctac aacaaccgga aatatgctgg cgaacgcgta      720
atgctgttat ttaccaaccc aacagatgta gagcgtctcg ttgaaggcgg cgtgaaaatc      780
acctctgtta acgtcgggtg tatggcattc cgtcagggtta aaaccagggt gaataacgcg      840
gtttcggttg atgaaaaaga tatcgaggcg ttcaagaaac tgaatgcgcg cggatttgag      900
ctggaagtcc gtaaggtttc caccgatccg aaactgaaaa tgatggatct gatcagcaaa      960
atcgataagt aa                                                                972

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```

<210> 45
<211> 323
<212> PRT
<213> Escherichia coli

```

```
<400> 45
```

```

Met Thr Ile Ala Ile Val Ile Gly Thr His Gly Trp Ala Ala Glu Gln
1           5           10           15

```

```

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

```

```

Trp Ile Asp Phe Val Pro Gly Glu Asn Ala Glu Thr Leu Ile Glu Lys
          35           40           45

```

```

Tyr Asn Ala Gln Leu Ala Lys Leu Asp Thr Thr Lys Gly Val Leu Phe
          50           55           60

```

```

Leu Val Asp Thr Trp Gly Gly Ser Pro Phe Asn Ala Ala Ser Arg Ile
65           70           75           80

```

```

Val Val Asp Lys Glu His Tyr Glu Val Ile Ala Gly Val Asn Ile Pro
          85           90           95

```

```

Met Leu Val Glu Thr Leu Met Ala Arg Asp Asp Asp Pro Ser Phe Asp
          100          105          110

```

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

<210> 46
 <211> 801
 <212> DNA
 <213> Escherichia coli

<400> 46
 atggagatta ccactcttca aattgtgctg gtatttatcg tagcctgtat cgcaggtatg

```

ggatcaatcc tcgatgaatt tcagtttcac cgtccgctaa tcgCGTgtac cctggTgggt      120
atcgttcttg gggatatgaa aaccggtatt attatcggTg gtacgctgga aatgatcgcg      180
ctgggctgga tgaacatcgg tgctgcagtt gcgcctgacg ccgctctggc ttctatcatt      240
tctaccattc tggttatcgc aggtcatcag agcattggTg caggtatcgc actggcaatc      300
cctctggccg ctgcgggcca ggtactgacc atcatcgTtc gtactattac cgttgctttc      360
cagcacgctg cggataaggc tgctgataac ggcaacctga cagcgatttc ctggatccac      420
gtttcttctc tgttcctgca agcaatgcgt gtggctattc cggccgtcat cgttgcgctg      480
tctgttggtg ccagcgaagt acagaacatg ctgaatgcga ttccggaagt ggtgaccaat      540
ggTctgaata tcgccggTgg catgatcgTg gtggTtggtt atgcgatggT tatcaacatg      600
atgcgtgctg gctacctgat gccgttcttc tacctcggct tcgtaaccgc agcattcacc      660
aactttaacc tggTtgctct gggtgtgatt ggtactgtta tggcagtgct ctacatccaa      720
cttagcccga aatacaaccg cgtagccggt gcgcctgctc aggcagctgg taacaacgat      780
ctcgataacg aactggacta a                                     801

```

```

<210> 47
<211> 266
<212> PRT
<213> Escherichia coli

<400> 47

```

```

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

```

```

Ile Ala Gly Met Gly Ser Ile Leu Asp Glu Phe Gln Phe His Arg Pro
          20           25           30

```

```

Leu Ile Ala Cys Thr Leu Val Gly Ile Val Leu Gly Asp Met Lys Thr
          35           40           45

```

```

Gly Ile Ile Ile Gly Gly Thr Leu Glu Met Ile Ala Leu Gly Trp Met
          50           55           60

```

```

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

```

```

Ser Thr Ile Leu Val Ile Ala Gly His Gln Ser Ile Gly Ala Gly Ile
          85           90           95

```

```

Ala Leu Ala Ile Pro Leu Ala Ala Ala Gly Gln Val Leu Thr Ile Ile
          100          105          110

```

```

Val Arg Thr Ile Thr Val Ala Phe Gln His Ala Ala Asp Lys Ala Ala

```

115

120

125

Asp Asn Gly Asn Leu Thr Ala Ile Ser Trp Ile His Val Ser Ser Leu
 130 135 140

Phe Leu Gln Ala Met Arg Val Ala Ile Pro Ala Val Ile Val Ala Leu
 145 150 155 160

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

Val Val Thr Asn Gly Leu Asn Ile Ala Gly Gly Met Ile Val Val Val
 180 185 190

Gly Tyr Ala Met Val Ile Asn Met Met Arg Ala Gly Tyr Leu Met Pro
 195 200 205

Phe Phe Tyr Leu Gly Phe Val Thr Ala Ala Phe Thr Asn Phe Asn Leu
 210 215 220

Val Ala Leu Gly Val Ile Gly Thr Val Met Ala Val Leu Tyr Ile Gln
 225 230 235 240

Leu Ser Pro Lys Tyr Asn Arg Val Ala Gly Ala Pro Ala Gln Ala Ala
 245 250 255

Gly Asn Asn Asp Leu Asp Asn Glu Leu Asp
 260 265

<210> 48

<211> 852

<212> DNA

<213> Escherichia coli

<400> 48

atggttgata caactcaaac taccaccgag aaaaaactca ctcaaagtga tattcgtggc 60

gtcttcctgc gttctaacct cttccagggt tcatggaact tcgaacgtat gcaggcactg 120

ggtttctgct tctctatggt accggcaatt cgctgcctct accctgagaa caacgaagct 180

cgtaaacaag ctattcgccg tcacctggag ttctttaaca cccagccgtt cgtggctgcg 240

ccgattctcg gcgtaaccct ggcgctggaa gaacagcgtg ctaatggcgc agagatcgac 300

gacggtgcta tcaacggtat caaagtcggt ttgatggggc cactggctgg tgtaggcgac 360

ccgatcttct ggggaaccgt acgtccggtt tttgcagcac tgggtgccgg tatcgcgatg 420

agcggcagcc tgtaggtcc gctgctgttc ttcatcctgt ttaacctggt gcgtctggca 480

accggttact acggcgtagc gtatggttac tccaaaggta tcgatatcgt taaagatatg 540

ggtagtggtt tcctgcaaaa actgacggaa ggggcgtcta tcctcggcct gtttgtcatg 600

ggggcattgg ttaacaagtg gacacatgtc aacatcccgc tggttgtctc tcgcattact 660
 gaccagacgg gcaaagaaca cgttactact gtccagacta ttctggacca gttaatgcca 720
 ggccctggtag cactgctgct gacctttgct tgtatgtggc tactgcgcaa aaaagttaac 780
 ccgctgtgga tcatcgttgg cttcttcgtc atcggtatcg ctggttacgc ttgcggcctg 840
 ctgggactgt aa 852

<210> 49
 <211> 283
 <212> PRT
 <213> Escherichia coli

<400> 49

Met Val Asp Thr Thr Gln Thr Thr Thr Glu Lys Lys Leu Thr Gln Ser
1 5 10 15

Asp Ile Arg Gly Val Phe Leu Arg Ser Asn Leu Phe Gln Gly Ser Trp
20 25 30

Asn Phe Glu Arg Met Gln Ala Leu Gly Phe Cys Phe Ser Met Val Pro
35 40 45

Ala Ile Arg Arg Leu Tyr Pro Glu Asn Asn Glu Ala Arg Lys Gln Ala
50 55 60

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

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

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

Gly Pro Leu Ala Gly Val Gly Asp Pro Ile Phe Trp Gly Thr Val Arg
115 120 125

Pro Val Phe Ala Ala Leu Gly Ala Gly Ile Ala Met Ser Gly Ser Leu
130 135 140

Leu Gly Pro Leu Leu Phe Phe Ile Leu Phe Asn Leu Val Arg Leu Ala
145 150 155 160

Thr Arg Tyr Tyr Gly Val Ala Tyr Gly Tyr Ser Lys Gly Ile Asp Ile
165 170 175

Val Lys Asp Met Gly Gly Gly Phe Leu Gln Lys Leu Thr Glu Gly Ala

180

185

190

Ser Ile Leu Gly Leu Phe Val Met Gly Ala Leu Val Asn Lys Trp Thr
 195 200 205

His Val Asn Ile Pro Leu Val Val Ser Arg Ile Thr Asp Gln Thr Gly
 210 215 220

Lys Glu His Val Thr Thr Val Gln Thr Ile Leu Asp Gln Leu Met Pro
 225 230 235 240

Gly Leu Val Pro Leu Leu Leu Thr Phe Ala Cys Met Trp Leu Leu Arg
 245 250 255

Lys Lys Val Asn Pro Leu Trp Ile Ile Val Gly Phe Phe Val Ile Gly
 260 265 270

Ile Ala Gly Tyr Ala Cys Gly Leu Leu Gly Leu
 275 280

<210> 50

<211> 1434

<212> DNA

<213> Escherichia coli

<400> 50

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tccgtactgc ctatcgcagg tattctgctg ggcgtcggtt ccgcgaattt cagctggctg	120
cccgccgttg tatcgcatgt tatggcagaa gcaggcggtt ccgtctttgc aaacatgcca	180
ctgatttttg cgatcgggtg cgccctcggc tttaaccaata acgatggcgt atccgcgctg	240
gccgcagttg ttgcctatgg catcatggtt aaaaccatgg ccgtggttgc gccactggta	300
ctgcatttac ctgctgaaga aatcgcctct aaacacctgg cggatactgg cgtactcgga	360
gggattatct ccggtgcat cgcagcgtac atgtttaacc gtttctaccg tattaagctg	420
cctgagtatc ttggcttctt tgccggtaaa cgctttgtgc cgatcatttc tggcctggct	480
gccatcttta ctggcggttg gctgtccttc atttggccgc cgattggttc tgcaatccag	540
accttctctc agtgggctgc ttaccagaac ccggtagttg cgtttggtat ttacggtttc	600
atcgaacgtt gcctggtacc gtttggtctg caccacatct ggaacgtacc tttccagatg	660
cagattggtg aatacaccaa cgcagcaggt caggttttcc acggcgacat tccgcgttat	720
atggcgggtg acccgactgc gggtaaaactg tctggtggct tcctgttcaa aatgtacggt	780
ctgccagctg ccgcaattgc tatctggcac tctgctaaac cagaaaaccg cgcgaaagtg	840
ggcgggtatta tgatctccgc ggcgctgacc tcgttcctga ccggtatcac cgagccgac	900
gagttctcct tcatgttcgt tgcgccgatc ctgtacatca tccacgcgat tctggcaggc	960

ctggcattcc caatctgtat tcttctgggg atgcgtgacg gtacgtcggt ctgcacggg 1020
 ctgatcgact tcatcgttct gtctggtaac agcagcaaac tgtggctgtt cccgatcgtc 1080
 ggtatcggtt atgcgattgt ttactacacc atcttccgcg tgctgattaa agcactggat 1140
 ctgaaaacgc cgggtcgtga agacgcgact gaagatgcaa aagcgacagg taccagcgaa 1200
 atggcaccgg ctctggttgc tgcatttggg ggtaaagaaa acattactaa cctcgacgca 1260
 tgtattaccc gtctgcgcgt cagcgttgct gatgtgtcta aagtggatca ggccggcctg 1320
 aagaaactgg gcgcagcggg cgtagtggtt gctggttctg gtgttcaggc gattttcggg 1380
 actaaatccg ataacctgaa aaccgagatg gatgagtaca tccgtaacca ctaa 1434

<210> 51
 <211> 477
 <212> PRT
 <213> Escherichia coli

<400> 51

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

Met Leu Pro Val Ser Val Leu Pro Ile Ala Gly Ile Leu Leu Gly Val
 20 25 30

Gly Ser Ala Asn Phe Ser Trp Leu Pro Ala Val Val Ser His Val Met
 35 40 45

Ala Glu Ala Gly Gly Ser Val Phe Ala Asn Met Pro Leu Ile Phe Ala
 50 55 60

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

Ala Ala Val Val Ala Tyr Gly Ile Met Val Lys Thr Met Ala Val Val
 85 90 95

Ala Pro Leu Val Leu His Leu Pro Ala Glu Glu Ile Ala Ser Lys His
 100 105 110

Leu Ala Asp Thr Gly Val Leu Gly Gly Ile Ile Ser Gly Ala Ile Ala
 115 120 125

Ala Tyr Met Phe Asn Arg Phe Tyr Arg Ile Lys Leu Pro Glu Tyr Leu
 130 135 140

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

Ala Ile Phe Thr Gly Val Val Leu Ser Phe Ile Trp Pro Pro Ile Gly
 165 170 175

Ser Ala Ile Gln Thr Phe Ser Gln Trp Ala Ala Tyr Gln Asn Pro Val
 180 185 190

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

Gly Leu His His Ile Trp Asn Val Pro Phe Gln Met Gln Ile Gly Glu
 210 215 220

Tyr Thr Asn Ala Ala Gly Gln Val Phe His Gly Asp Ile Pro Arg Tyr
 225 230 235 240

Met Ala Gly Asp Pro Thr Ala Gly Lys Leu Ser Gly Gly Phe Leu Phe
 245 250 255

Lys Met Tyr Gly Leu Pro Ala Ala Ala Ile Ala Ile Trp His Ser Ala
 260 265 270

Lys Pro Glu Asn Arg Ala Lys Val Gly Gly Ile Met Ile Ser Ala Ala
 275 280 285

Leu Thr Ser Phe Leu Thr Gly Ile Thr Glu Pro Ile Glu Phe Ser Phe
 290 295 300

Met Phe Val Ala Pro Ile Leu Tyr Ile Ile His Ala Ile Leu Ala Gly
 305 310 315 320

Leu Ala Phe Pro Ile Cys Ile Leu Leu Gly Met Arg Asp Gly Thr Ser
 325 330 335

Phe Ser His Gly Leu Ile Asp Phe Ile Val Leu Ser Gly Asn Ser Ser
 340 345 350

Lys Leu Trp Leu Phe Pro Ile Val Gly Ile Gly Tyr Ala Ile Val Tyr
 355 360 365

Tyr Thr Ile Phe Arg Val Leu Ile Lys Ala Leu Asp Leu Lys Thr Pro
 370 375 380

Gly Arg Glu Asp Ala Thr Glu Asp Ala Lys Ala Thr Gly Thr Ser Glu
 385 390 395 400

Met Ala Pro Ala Leu Val Ala Ala Phe Gly Gly Lys Glu Asn Ile Thr
 405 410 415

Asn Leu Asp Ala Cys Ile Thr Arg Leu Arg Val Ser Val Ala Asp Val
420 425 430

Ser Lys Val Asp Gln Ala Gly Leu Lys Lys Leu Gly Ala Ala Gly Val
435 440 445

Val Val Ala Gly Ser Gly Val Gln Ala Ile Phe Gly Thr Lys Ser Asp
450 455 460

Asn Leu Lys Thr Glu Met Asp Glu Tyr Ile Arg Asn His
465 470 475

<210> 52
<211> 510
<212> DNA
<213> Escherichia coli

<400> 52
atggggtttgt tcgataaaact gaaatctctg gtttccgacg acaagaagga taccggaact 60
attgagatca ttgctccgct ctctggcgag atcgtcaata tcgaagacgt gccggatgtc 120
gttttttgcgg aaaaaatcgt tggatgatgtt attgctatca aaccaacggg taacaaaatg 180
gtcgcgccag tagacggcac cattggtaaa atctttgaaa ccaaccacgc attctctatc 240
gaatctgata gcggcggttga actgttcgtc cacttcggta tcgacaccgt tgaactgaaa 300
ggcgaaggct tcaagcgtat tgctgaagaa ggtcagcgcg tgaaagtgtg cgatactgtc 360
attgaatttg atctgccgct gctggaagag aaagccaagt ctaccctgac tccggttgtt 420
atctccaaca tggacgaaat caaagaactg atcaaactgt ccggtagcgt aaccgtgggt 480
gaaaccccggt ttatccgcat caagaagtaa 510

<210> 53
<211> 169
<212> PRT
<213> Escherichia coli

<400> 53

Met Gly Leu Phe Asp Lys Leu Lys Ser Leu Val Ser Asp Asp Lys Lys
1 5 10 15

Asp Thr Gly Thr Ile Glu Ile Ile Ala Pro Leu Ser Gly Glu Ile Val
20 25 30

Asn Ile Glu Asp Val Pro Asp Val Val Phe Ala Glu Lys Ile Val Gly
35 40 45

Asp Gly Ile Ala Ile Lys Pro Thr Gly Asn Lys Met Val Ala Pro Val
50 55 60

Asp Gly Thr Ile Gly Lys Ile Phe Glu Thr Asn His Ala Phe Ser Ile
65 70 75 80

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

Val Glu Leu Lys Gly Glu Gly Phe Lys Arg Ile Ala Glu Glu Gly Gln
100 105 110

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

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

Asp Glu Ile Lys Glu Leu Ile Lys Leu Ser Gly Ser Val Thr Val Gly
145 150 155 160

Glu Thr Pro Val Ile Arg Ile Lys Lys
165

<210> 54
<211> 1248
<212> DNA
<213> Escherichia coli

<400> 54
atggcactga atattccatt cagaaatgcg tactatcggt ttgcatccag ttactcattt 60
ctcttttttta tttcctgggtc gctgtggtgg tcgttatacg ctatttggct gaaaggacat 120
ctaggattaa cagggacgga attaggtaca ctttattcgg tcaaccagtt taccagcatt 180
ctatttatga tgttctacgg catcggtcag gataaactcg gtctgaagaa accgctcatc 240
tggtgtatga gtttcattct ggtcttgacc ggaccgttta tgatttacgt ttatgaaccg 300
ttactgcaaa gcaatttttc tgtaggtcta attctggggg cgctcttttt tggcctgggg 360
tatctggcgg gatgcggttt gcttgacagc ttcaccgaaa aaatggcgcg aaattttcat 420
ttcgaatatg gaacagcgcg cgctgggga tcttttggct atgctattgg cgcgttcttt 480
gccggtatat ttttagtat cagtcccat atcaacttct ggttgggtct gctatttggc 540
gctgtattta tgatgatcaa catgcgtttt aaagataagg atcaccagtg catagcggcg 600
gatgcgggag gggtaaaaaa agaggatttt atcgcagttt tcaaggatcg aaacttctgg 660
gttttcgtca tatttattgt ggggacgtgg tctttctata acatttttga tcaacaactc 720
tttctgtct tttatgcagg tttattcgaa tcacacgatg taggaacgcg cctgtatggt 780
tatctcaact cattccaggt ggtactcgaa gcgctgtgca tggcgattat tcctttcttt 840
gtgaatcggg tagggccaaa aaatgcatta cttatcggtg ttgtgattat ggcgttgctg 900

atcctttcct gcgcgttggt cgtaacccc tggattatct cattagtga gctgttacat	960
gccattgagg ttccactttg tgtcatatcc gtcttcaa acagcgtggc aaactttgat	1020
aagcgcctgt cgtcgacgat ctttctgatt ggttttcaaa ttgccagttc gcttgggatt	1080
gtgctgcttt caacgccgac tgggatactc tttgaccacg caggctacca gacagttttc	1140
ttcgcaattt cgggtattgt ctgcctgatg ttgctatttg gcattttctt cctgagtaaa	1200
aaacgcgagc aaatagttat ggaaacgcct gtaccttcag caatatag	1248

<210> 55
 <211> 415
 <212> PRT
 <213> Escherichia coli

<400> 55

Met	Ala	Leu	Asn	Ile	Pro	Phe	Arg	Asn	Ala	Tyr	Tyr	Arg	Phe	Ala	Ser
1				5					10					15	

Ser	Tyr	Ser	Phe	Leu	Phe	Phe	Ile	Ser	Trp	Ser	Leu	Trp	Trp	Ser	Leu
			20					25					30		

Tyr	Ala	Ile	Trp	Leu	Lys	Gly	His	Leu	Gly	Leu	Thr	Gly	Thr	Glu	Leu
		35					40					45			

Gly	Thr	Leu	Tyr	Ser	Val	Asn	Gln	Phe	Thr	Ser	Ile	Leu	Phe	Met	Met
	50					55					60				

Phe	Tyr	Gly	Ile	Val	Gln	Asp	Lys	Leu	Gly	Leu	Lys	Lys	Pro	Leu	Ile
65				70					75					80	

Trp	Cys	Met	Ser	Phe	Ile	Leu	Val	Leu	Thr	Gly	Pro	Phe	Met	Ile	Tyr
				85					90					95	

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

Gly	Ala	Leu	Phe	Phe	Gly	Leu	Gly	Tyr	Leu	Ala	Gly	Cys	Gly	Leu	Leu
		115					120					125			

Asp	Ser	Phe	Thr	Glu	Lys	Met	Ala	Arg	Asn	Phe	His	Phe	Glu	Tyr	Gly
	130					135					140				

Thr	Ala	Arg	Ala	Trp	Gly	Ser	Phe	Gly	Tyr	Ala	Ile	Gly	Ala	Phe	Phe
145					150					155					160

Ala	Gly	Ile	Phe	Phe	Ser	Ile	Ser	Pro	His	Ile	Asn	Phe	Trp	Leu	Val
			165						170					175	

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

<210> 56
 <211> 924
 <212> DNA

<213> Escherichia coli

<400> 56

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atgtcagcca aagtatgggt tttaggggat gcggtcgtag atctcttgcc agaatcagac      60
gggcggctac tgccttgctc tggcggcgcg ccagctaacg ttgcggtggg aatcgccaga      120
ttaggcggaa caagtgggtt tataggtcgg gtcggtgatg atccttttgg tgcgttaatg      180
caaagaacgc tgctaactga ggggtgtcgt atcacgtatc tgaagcaaga tgaatggcac      240
cggacatcca cggtgcttgt cgatctgaac gatcaaggag aacgttcatt tacgtttatg      300
gtccgccccca gtgccgatct ttttttagag acgacagact tgccctgctg gcgacatggc      360
gaatgggttac atctctgttc aattgcgttg tctgccgagc cttcgcgtac cagcgcattt      420
actgcgatga cggcgatccg gcatgccgga ggttttgtca gcttcgatcc caatattcgt      480
gaagatctat ggcaagacga gcatttgctc cgcttggtgt tgcggcaggc gctacaactg      540
gcggatgtcg tcaagctctc ggaagaagaa tggcgactta tcagtggaaa aacacagaac      600
gatcggggata tatgcgccct ggcaaaagag tatgagatcg ccatgctgtt ggtgactaaa      660
ggtgcagaag gggtggtggt ctgttatcga ggacaagtcc accattttgc tggaatgtct      720
gtgaattgtg tcgatagcac tggggcgggg gatgcgttcg ttgccggggt actcacaggt      780
ctgtcctcta cgggattatc tacagatgag agagaaatgc gacgaattat cgatctcgct      840
caacgttgcg gagcgcttgc agtaacagcg aaaggggcaa tgacagcgct gccatgtcga      900
caagaactgg aaagtgagaa gtaa                                             924
```

<210> 57

<211> 307

<212> PRT

<213> Escherichia coli

<400> 57

```
Met Ser Ala Lys Val Trp Val Leu Gly Asp Ala Val Val Asp Leu Leu
1          5          10          15
```

```
Pro Glu Ser Asp Gly Arg Leu Leu Pro Cys Pro Gly Gly Ala Pro Ala
          20          25          30
```

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

```
Gly Arg Val Gly Asp Asp Pro Phe Gly Ala Leu Met Gln Arg Thr Leu
          50          55          60
```

```
Leu Thr Glu Gly Val Asp Ile Thr Tyr Leu Lys Gln Asp Glu Trp His
65          70          75          80
```

```
Arg Thr Ser Thr Val Leu Val Asp Leu Asn Asp Gln Gly Glu Arg Ser
```

85

90

95

Phe Thr Phe Met Val Arg Pro Ser Ala Asp Leu Phe Leu Glu Thr Thr
 100 105 110

Asp Leu Pro Cys Trp Arg His Gly Glu Trp Leu His Leu Cys Ser Ile
 115 120 125

Ala Leu Ser Ala Glu Pro Ser Arg Thr Ser Ala Phe Thr Ala Met Thr
 130 135 140

Ala Ile Arg His Ala Gly Gly Phe Val Ser Phe Asp Pro Asn Ile Arg
 145 150 155 160

Glu Asp Leu Trp Gln Asp Glu His Leu Leu Arg Leu Cys Leu Arg Gln
 165 170 175

Ala Leu Gln Leu Ala Asp Val Val Lys Leu Ser Glu Glu Glu Trp Arg
 180 185 190

Leu Ile Ser Gly Lys Thr Gln Asn Asp Arg Asp Ile Cys Ala Leu Ala
 195 200 205

Lys Glu Tyr Glu Ile Ala Met Leu Leu Val Thr Lys Gly Ala Glu Gly
 210 215 220

Val Val Val Cys Tyr Arg Gly Gln Val His His Phe Ala Gly Met Ser
 225 230 235 240

Val Asn Cys Val Asp Ser Thr Gly Ala Gly Asp Ala Phe Val Ala Gly
 245 250 255

Leu Leu Thr Gly Leu Ser Ser Thr Gly Leu Ser Thr Asp Glu Arg Glu
 260 265 270

Met Arg Arg Ile Ile Asp Leu Ala Gln Arg Cys Gly Ala Leu Ala Val
 275 280 285

Thr Ala Lys Gly Ala Met Thr Ala Leu Pro Cys Arg Gln Glu Leu Glu
 290 295 300

Ser Glu Lys
 305

<210> 58

<211> 1434

<212> DNA

<213> Escherichia coli

```

<400> 58
atgacgcaat ctcgattgca tgcggcgcaa aacgccctag caaaacttca tgagcaccgg      60
ggtaaacactt tctatcccca ttttcacctc gcgcctcctg ccgggtggat gaacgatcca      120
aacggcctga tctggtttta cgatcgttat cagcgtttt atcaacatca tccgatgagc      180
gaacactggg ggccaatgca ctggggacat gccaccagcg acgatatgat cactggcag      240
catgagccta ttgcgctagc gccaggagac gataatgaca aagacgggtg tttttcaggt      300
agtgtgtcg atgacaatgg tgtcctctca cttatctaca ccggacacgt ctggctcgat      360
ggtgcaggta atgacgatgc aattcgcgaa gtacaatgtc tggctaccag tcgggatggt      420
attcatttcg agaaacaggg tgtgatcctc actccaccag aaggaatcat gcacttccgc      480
gatcctaaag tgtggcgtga agccgacaca tgggtggatgg tagtcggggc gaaagatcca      540
ggcaacacgg ggcagatcct gctttatcgc gccagttcat tgcgtgaatg gaccttcgat      600
cgcgtactgg cccacgctga tgcgggtgaa agctatatgt gggaatgtcc ggactttttc      660
agccttggcg atcagcatta tctgatgttt tccccgcagg gaatgaatgc cgagggatac      720
agttaccgaa atcgctttca aagtggcgta ataccggaa tgtggtcgcc aggacgactt      780
tttgcacaat ccgggcattt tactgaactt gataacgggc atgactttta tgcaccacaa      840
agcttttttag cgaaggatgg tcggcgatatt gttatcggat ggatggatat gtgggaatcg      900
ccaatgccct caaaacgtga aggctgggca ggctgcatga cgctggcgcg cgagctatca      960
gagagcaatg gcaaacttct acaacgcccg gttcacgaag ctgagtcgtt acgccagcag      1020
catcaatctg tctctccccg cacaatcagc aataaatatg ttttgagga aaacgcgcaa      1080
gcagttgaga ttcagttgca gtgggcgctg aagaacagtg atgccgaaca ttacggatta      1140
cagctcggca ctggaatgcg gctgtatatt gataaccaat ctgagcgact tgttttgtgg      1200
cgggtattacc cacacgagaa tttagacggc taccgtagta ttcccctccc gcagcgtgac      1260
acgctcgccc taaggatatt tatcgatata tcatccgtgg aagtatttat taacgacggg      1320
gaagcgggtga tgagtagtcg aatctatccg cagccagaag aacgggaact gtcgctttat      1380
gcctcccacg gagtggctgt gctgcaacat ggagcactct ggctactggg ttaa      1434

```

```

<210> 59
<211> 480
<212> PRT
<213> Escherichia coli

```

```

<400> 59
Met Ile Lys Met Thr Gln Ser Arg Leu His Ala Ala Gln Asn Ala Leu
1           5           10           15

Ala Lys Leu His Glu His Arg Gly Asn Thr Phe Tyr Pro His Phe His
          20           25           30

```

Leu Ala Pro Pro Ala Gly Trp Met Asn Asp Pro Asn Gly Leu Ile Trp
 35 40 45

Phe Asn Asp Arg Tyr His Ala Phe Tyr Gln His His Pro Met Ser Glu
 50 55 60

His Trp Gly Pro Met His Trp Gly His Ala Thr Ser Asp Asp Met Ile
 65 70 75 80

His Trp Gln His Glu Pro Ile Ala Leu Ala Pro Gly Asp Asp Asn Asp
 85 90 95

Lys Asp Gly Cys Phe Ser Gly Ser Ala Val Asp Asp Asn Gly Val Leu
 100 105 110

Ser Leu Ile Tyr Thr Gly His Val Trp Leu Asp Gly Ala Gly Asn Asp
 115 120 125

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

His Phe Glu Lys Gln Gly Val Ile Leu Thr Pro Pro Glu Gly Ile Met
 145 150 155 160

His Phe Arg Asp Pro Lys Val Trp Arg Glu Ala Asp Thr Trp Trp Met
 165 170 175

Val Val Gly Ala Lys Asp Pro Gly Asn Thr Gly Gln Ile Leu Leu Tyr
 180 185 190

Arg Gly Ser Ser Leu Arg Glu Trp Thr Phe Asp Arg Val Leu Ala His
 195 200 205

Ala Asp Ala Gly Glu Ser Tyr Met Trp Glu Cys Pro Asp Phe Phe Ser
 210 215 220

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

Glu Gly Tyr Ser Tyr Arg Asn Arg Phe Gln Ser Gly Val Ile Pro Gly
 245 250 255

Met Trp Ser Pro Gly Arg Leu Phe Ala Gln Ser Gly His Phe Thr Glu
 260 265 270

Leu Asp Asn Gly His Asp Phe Tyr Ala Pro Gln Ser Phe Leu Ala Lys
 275 280 285

Asp Gly Arg Arg Ile Val Ile Gly Trp Met Asp Met Trp Glu Ser Pro
 290 295 300
 Met Pro Ser Lys Arg Glu Gly Trp Ala Gly Cys Met Thr Leu Ala Arg
 305 310 315 320
 Glu Leu Ser Glu Ser Asn Gly Lys Leu Leu Gln Arg Pro Val His Glu
 325 330 335
 Ala Glu Ser Leu Arg Gln Gln His Gln Ser Val Ser Pro Arg Thr Ile
 340 345 350
 Ser Asn Lys Tyr Val Leu Gln Glu Asn Ala Gln Ala Val Glu Ile Gln
 355 360 365
 Leu Gln Trp Ala Leu Lys Asn Ser Asp Ala Glu His Tyr Gly Leu Gln
 370 375 380
 Leu Gly Thr Gly Met Arg Leu Tyr Ile Asp Asn Gln Ser Glu Arg Leu
 385 390 395 400
 Val Leu Trp Arg Tyr Tyr Pro His Glu Asn Leu Asp Gly Tyr Arg Ser
 405 410 415
 Ile Pro Leu Pro Gln Arg Asp Thr Leu Ala Leu Arg Ile Phe Ile Asp
 420 425 430
 Thr Ser Ser Val Glu Val Phe Ile Asn Asp Gly Glu Ala Val Met Ser
 435 440 445
 Ser Arg Ile Tyr Pro Gln Pro Glu Glu Arg Glu Leu Ser Leu Tyr Ala
 450 455 460
 Ser His Gly Val Ala Val Leu Gln His Gly Ala Leu Trp Leu Leu Gly
 465 470 475 480

<210> 60
 <211> 954
 <212> DNA
 <213> Escherichia coli

<400> 60
 atgatgacag tctcccggt gatgcataat gcagaatctg tgcgtcctgc aacgcgtgac 60
 cgcgtattgc aggcaatcca gaccctgaat tatgttcctg atctttccgc ccgtaagatg 120
 cgcgctcaag gacgtaagcc gtcgactctc gccgtgctgg cgcaggacac ggctaccact 180
 cctttctctg ttgatattct gcttgccatt gagcaaaccg ccagcgagtt cggctggaat 240
 agttttttaa tcaatatattt ttctgaagat gacgctgccc gtgctgcacg tcagctgctt 300

```

gcccaccgtc cggatggcat tatctatact acaatggggc tgcgacatat cacgctgcct      360
gagtctctgt atggtgaaaa tattgtattg gcgaactgtg tggcggatga cccagcgtaa      420
cccagttata tccctgatga ttacactgca caatatgaat caacacagca tttgctcgcg      480
gcgggctatc gtcaaccgtt atgcttctgg ctaccggaaa gtgcggttggc aacagggtat      540
cgtcggcagg gatttgagca ggcctggcgt gatgctggac gagatctggc tgaggtgaaa      600
caatttcaca tggcaacagg tgatgatcac tacaccgatc tcgcaagttt actcaatgcc      660
cacttcaaat cgggcaaacc agattttgat gttctgatat gtggtaacga tcgcgcagct      720
tttgtggctt atcaggttct tttggcgaag ggggtacgta tcccgcagga tgtcgccgta      780
atgggctttg ataatctggt tggcgtcggg catctgtttt taccgccgct gaccacaatt      840
cagcttcac atgacattat cgggcgggaa gctgcattgc atattattga aggtcgtgaa      900
gggggaagag tgacccggat cccttgcccg ctgttgatcc gttgttcac ctga          954

```

```

<210> 61
<211> 317
<212> PRT
<213> Escherichia coli

```

```

<400> 61

```

```

Met Met Thr Val Ser Arg Val Met His Asn Ala Glu Ser Val Arg Pro
1              5              10              15

```

```

Ala Thr Arg Asp Arg Val Leu Gln Ala Ile Gln Thr Leu Asn Tyr Val
          20              25              30

```

```

Pro Asp Leu Ser Ala Arg Lys Met Arg Ala Gln Gly Arg Lys Pro Ser
          35              40              45

```

```

Thr Leu Ala Val Leu Ala Gln Asp Thr Ala Thr Thr Pro Phe Ser Val
50              55              60

```

```

Asp Ile Leu Leu Ala Ile Glu Gln Thr Ala Ser Glu Phe Gly Trp Asn
65              70              75              80

```

```

Ser Phe Leu Ile Asn Ile Phe Ser Glu Asp Asp Ala Ala Arg Ala Ala
          85              90              95

```

```

Arg Gln Leu Leu Ala His Arg Pro Asp Gly Ile Ile Tyr Thr Thr Met
          100              105              110

```

```

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

```

```

Val Leu Ala Asn Cys Val Ala Asp Asp Pro Ala Leu Pro Ser Tyr Ile

```

130

135

140

Pro Asp Asp Tyr Thr Ala Gln Tyr Glu Ser Thr Gln His Leu Leu Ala
145 150 155 160

Ala Gly Tyr Arg Gln Pro Leu Cys Phe Trp Leu Pro Glu Ser Ala Leu
165 170 175

Ala Thr Gly Tyr Arg Arg Gln Gly Phe Glu Gln Ala Trp Arg Asp Ala
180 185 190

Gly Arg Asp Leu Ala Glu Val Lys Gln Phe His Met Ala Thr Gly Asp
195 200 205

Asp His Tyr Thr Asp Leu Ala Ser Leu Leu Asn Ala His Phe Lys Ser
210 215 220

Gly Lys Pro Asp Phe Asp Val Leu Ile Cys Gly Asn Asp Arg Ala Ala
225 230 235 240

Phe Val Ala Tyr Gln Val Leu Leu Ala Lys Gly Val Arg Ile Pro Gln
245 250 255

Asp Val Ala Val Met Gly Phe Asp Asn Leu Val Gly Val Gly His Leu
260 265 270

Phe Leu Pro Pro Leu Thr Thr Ile Gln Leu Pro His Asp Ile Ile Gly
275 280 285

Arg Glu Ala Ala Leu His Ile Ile Glu Gly Arg Glu Gly Gly Arg Val
290 295 300

Thr Arg Ile Pro Cys Pro Leu Leu Ile Arg Cys Ser Thr
305 310 315

<210> 62

<211> 1254

<212> DNA

<213> Escherichia coli

<400> 62

atgtactatt taaaaaacac aaacttttgg atgttcggtt tattcttttt cttttacttt 60

tttatcatgg gaggctactt ccggtttttc ccgatttggc tacatgacat caaccatata 120

agcaaaagtg atacgggtat tattttttgcc gctattttctc tgttctcgct attattccaa 180

ccgctgtttg gtctgctttc tgacaaactc gggctgcgca aatacctgct gtggattatt 240

accggcatgt tagtgatggt tgcgccgttc tttattttta tcttcgggcc actgttacaa 300

tacaacattt tagtaggata gattgttggg ggtattttatc taggcttttg ttttaacgcc 360

```

ggtagcgccag cagtagaggc atttattgag aaagtcagcc gtcgcagtaa tttcgaattt      420
ggtagcgcgcg ggatgtttgg ctgtgttggc tgggcgctgt gtgcctcgat tgcgggcac      480
atgttcacca tcaataatca gtttgttttc tggctgggct ctggctgtgc actcatcctc      540
gccgttttac tctttttcgc caaaacggat gcgccctctt ctgccacggt tgccaatgcg      600
gtaggtgcca accattcggc atttagcctt aagctggcac tggaaactgtt cagacagcca      660
aaactgtggt ttttgtcact gtatgttatt ggcgtttcct gcacctacga tgtttttgac      720
caacagtttg ctaatttctt tacttcgttc tttgctaccg gtgaacaggg tacgcgggta      780
tttggctacg taacgacaat gggcgaatta cttaacgcct cgattatgtt ctttgcgcca      840
ctgatcatta atcgcatcgg tgggaaaaac gccctgctgc tggctggcac tattatgtct      900
gtacgtatta ttggctcatc gttcgccacc tcagcgctgg aagtggttat tctgaaaacg      960
ctgcatatgt ttgaagtacc gttcctgctg gtgggctgct ttaaataatat taccagccag    1020
tttgaagtgc gtttttcagc gacgatttat ctggctctgtt tctgcttctt taagcaactg    1080
gcgatgattt ttatgtctgt actggcgggc aatatgtatg aaagcatcgg tttccagggc    1140
gcttatctgg tgctgggtct ggtggcgctg ggcttcacct taatttccgt gttcacgctt    1200
agcggccccc gcccgcttcc cctgctgcgt cgtcagggtga atgaagtcgc ttaa          1254

```

```

<210> 63
<211> 417
<212> PRT
<213> Escherichia coli

```

```
<400> 63
```

```

Met Tyr Tyr Leu Lys Asn Thr Asn Phe Trp Met Phe Gly Leu Phe Phe
1              5              10              15

```

```

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

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Pro Leu Leu Gln Tyr Asn Ile Leu Val Gly Ser Ile Val Gly Gly Ile

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100					105					110					
Tyr	Leu	Gly	Phe	Cys	Phe	Asn	Ala	Gly	Ala	Pro	Ala	Val	Glu	Ala	Phe
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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

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> 64

<211> 3075

<212> DNA

<213> Escherichia coli

<400> 64

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tttgcttggg ttccggcacc agaagcgggt cgggaaagct ggctggagtg cgatcttctt	240
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caggatatgt ggcggatgag cggcattttc cgtgacgtct cgttgctgca taaaccgact	660
acacaaatca gcgatttcca tgttgccact cgctttaatg atgatttcag ccgcgctgta	720
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ttatggcagg gtgaaacgca ggtcgccagc ggcaccgcgc ctttcggcgg tgaaattatc	840
gatgagcgtg gtggttatgc cgatcgcgtc aactacgtc tgaacgtcga aaaccgaaa	900
ctgtggagcg ccgaaatccc gaatctctat cgtgcggttg ttgaactgca caccgccgac	960
ggcacgctga ttgaagcaga agcctgcgat gtcggtttcc gcgagggtcg gattgaaaat	1020
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acgctgtgcg accgctacgg cctgtatgtg gtggatgaag ccaatattga aaccacggc	1260
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tggtgtcaaa aataa	3075

<210> 65
<211> 1024
<212> PRT
<213> Escherichia coli

<400> 65

Met Thr Met Ile Thr Asp Ser Leu Ala Val Val Leu Gln Arg Arg Asp
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Trp Glu Asn Pro Gly Val Thr Gln Leu Asn Arg Leu Ala Ala His Pro
20 25 30

Pro Phe Ala Ser Trp Arg Asn Ser Glu Glu Ala Arg Thr Asp Arg Pro
35 40 45

Ser Gln Gln Leu Arg Ser Leu Asn Gly Glu Trp Arg Phe Ala Trp Phe
50 55 60

Pro Ala Pro Glu Ala Val Pro Glu Ser Trp Leu Glu Cys Asp Leu Pro
65 70 75 80

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	965	970	975	
Leu	His	Ala	Glu	Glu	Gly	Thr	Trp	Leu	Asn	Ile	Asp	Gly	Phe	His	Met	980	985	990	

Gly Ile Gly Gly Asp Asp Ser Trp Ser Pro Ser Val Ser Ala Glu Phe
 995 1000 1005

Gln Leu Ser Ala Gly Arg Tyr His Tyr Gln Leu Val Trp Cys Gln
 1010 1015 1020

Lys

<210> 66
 <211> 1119
 <212> DNA
 <213> Staphylococcus epidermidis

<400> 66
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 gtatcaaadc taattagtat tcagttcata acatttatga ttggagtatt ttattctacc 180
 ttcttagtta ataaagacat aaagaatttt ttaaaaataa tacatttatt tattctatta 240
 attactacta cttttattat atttgaacat tacttaataa tataatctgat ttagtagctata 300
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 tttagagtcg ctaaaacttt tggatatata gaatcatttt ttgcagtagg gtcatttttg 420
 ctccctgtaa ttgtgaaagt gtttgaatac cattcagata caaaacacgc tattatcttt 480
 atacttataa taaatataat cttattttta attatctatt cattagagtt tgaagtaagt 540
 agcagcgata gaaataaaat acccactactg tcttttaata aaaagtcaat gctagttatg 600
 attattttta catggtggtt cttttatatt agtatagaaa caaatttttc aaatttacta 660
 ccatatatca acttagtttc tgaaaaatat agctatatta ctgtaagtat attttgggtt 720
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 cctatgttcc ctttaggtgt tagtatcatt aatcaacata gtagtaataa gaacttacta 960
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 tcagctttat acattcatat tcccgtacat ttatctattt tattaatatt aatgacttgc 1080
 ttatttttaa gtactgtgat tttaaaaata aagcttttaa 1119

<210> 67
 <211> 372
 <212> PRT
 <213> Staphylococcus epidermidis

<400> 67

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

Arg Phe Arg Leu Glu Ser Leu Leu Leu Thr Tyr Thr Val Thr Ser Phe
260 265 270

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

Leu Ile Ile Leu Phe Leu Leu Thr Leu Phe Leu Ala Pro Met Phe Pro
290 295 300

Leu Gly Val Ser Ile Ile Asn Gln His Ser Ser Asn Lys Asn Leu Leu
305 310 315 320

Thr Ser Ile Phe Ile Ala Val Ala Gly Cys Gly Gly Ala Val Gly Ala
325 330 335

Val Ile Ile Lys Ser Ala Leu Tyr Ile His Ile Pro Val His Leu Ser
340 345 350

Ile Leu Leu Ile Leu Met Thr Cys Leu Phe Leu Ser Thr Val Ile Leu
355 360 365

Lys Ile Lys Leu
370

<210> 68
<211> 1350
<212> DNA
<213> Lactobacillus brevis

<400> 68
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acggcctttg ttcaaagtgc cttctatggt gggatatttct taattgccat tccggcatcc 240
ctgattatta agaagaacag ttataaattt gccatcatga ccgggttgat cttttatatc 300
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gccatctttg ccattgccat tggctctgagc ttcttggaac catcatgtga tacgtatagt 420
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ccgttaggcg acatcatggg aattgtttta gggaagtact taatttttgg ttctgtaggt 540
aatttatctg aaaagatgag ccatatgcac ggcgcagcac gcattgctta cggcgaacag 600
atgttacaat tgacgttacg gccttacaaa tatatcttaa tcgtgttact cgtgatgctg 660
attatctttg ccgtaacgcc tatgccacgg gctaaggcga cgaaggaaat tgggtggggaa 720
caacaagaag aacgtcctag tcttggggaa actctgaagt atctatcaca caacaagcac 780

tatattaaag gggtagtaac ccagttcttt tatgcgggtc tgcaaacaac cgtctggtcc	840
tttacgattc gtttggtatt aaacttgaac catcaaatta ccgacagcgg tgcatacaacc	900
tttatgattt atagttatgt ggcgtgggtc gttggtaagc tggttgccaa tacctttatg	960
agtcgcttct caattacgaa ggtgctgacg tgggtactcct tattggggac attagcatta	1020
gttgtgacct ttacggttcc gaatatgatt gcggtctacg cagccatctt aacgagtttc	1080
ttctttggtc cagaatggcc aacaatttat gcgcacacgt tggatgccgt tacggagaag	1140
aaatacactg aaacggctgg ggcaattatc gtgatggccc tgatcgggtg tgcagtcatt	1200
ccagccattc aaggcctggt ttctgatgcg accggttcaa tgcagttctc attcgttgta	1260
ccaatgctct gctacgcttt aattacaggg tactttttct tcgaacatcg ttttgagaaa	1320
gctcacccta acgaagttca agaacattaa	1350

<210> 69
 <211> 449
 <212> PRT
 <213> Lactobacillus brevis

<400> 69

Met	Gln	Ala	Thr	Glu	Thr	Lys	His	Gly	Trp	Thr	Gln	Leu	Ala	Asp	Gly
1				5					10					15	

Tyr	Leu	Ser	Lys	Thr	Pro	Leu	Phe	Gln	Phe	Ile	Leu	Val	Ser	Leu	Ile
			20					25					30		

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

Gln	Phe	Lys	Thr	Val	Phe	Gln	Leu	Asn	Asp	Ala	Ala	Thr	Ala	Phe	Val
50						55					60				

Gln	Ser	Ala	Phe	Tyr	Gly	Gly	Tyr	Phe	Leu	Ile	Ala	Ile	Pro	Ala	Ser
65					70					75					80

Leu	Ile	Ile	Lys	Lys	Asn	Ser	Tyr	Lys	Phe	Ala	Ile	Met	Thr	Gly	Leu
			85						90					95	

Ile	Phe	Tyr	Ile	Ile	Gly	Cys	Gly	Leu	Phe	Phe	Pro	Ala	Ser	His	Leu
			100					105					110		

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

Leu	Ser	Phe	Leu	Glu	Thr	Ser	Cys	Asp	Thr	Tyr	Ser	Ser	Met	Leu	Gly
130						135					140				

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

Pro	Ala	Ile	Gln	Gly	Leu	Val	Ser	Asp	Ala	Thr	Gly	Ser	Met	Gln	Phe
				405					410					415	
Ser	Phe	Val	Val	Pro	Met	Leu	Cys	Tyr	Ala	Leu	Ile	Thr	Gly	Tyr	Phe
			420					425					430		
Phe	Phe	Glu	His	Arg	Phe	Glu	Lys	Ala	His	Pro	Asn	Glu	Val	Gln	Glu
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His

<210> 70
 <211> 2379
 <212> DNA
 <213> Escherichia coli

<400> 70	
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atgggtgttt ccgttccgaa tggtttcgcc acaaccgccg acgcgtttaa ccagtttctg	180
gaccaaagcg gcgtaaacca gcgcatttat gaactgctgg ataaaacgga tattgacgat	240
gttactcagc ttgcgaaagc gggcgcgcaa atccgccagt ggattatcga cactcccttc	300
cagcctgagc tggaaaacgc catccgcgaa gcctatgcac agctttccgc cgatgacgaa	360
aacgcctctt ttgcggtgcg ctccctccgcc accgcagaag atatgccgga cgcttctttt	420
gccggtcagc aggaaacctt cctcaacgtt cagggttttg acgccgttct cgtggcagtg	480
aaacatgtat ttgcttctct gtttaacgat cgcgccatct cttatcgtgt gcaccaggg	540
tacgatcacc gtggtgtggc gctctccgcc ggtgttcaac ggatggtgcg ctctgacctc	600
gcatcatctg gcgtgatgtt ctccattgat accgaatccg gctttgacca ggtggtgttt	660
atcacttccg catggggcct tggtgagatg gtcgtgcagg gtgcggttaa cccggatgag	720
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gggtcgaaaa aaatccgcat ggtttacgcg ccgaccagag agcacggcaa gcagggttaa	840
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gaactggcaa aacaggccgt acaaattgag aaacactacg gtcgcccgat ggatattgag	960
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cgtcacgcg gtcaggatcat ggagcgttat acgctgcatt cacagggtaa gattatcgcc	1080
gaaggccgtg ctatcggatc tcgcatcggg gcgggtccgg tgaaagtcac ccatgacatc	1140
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tgggaaccga tcatgaagaa agcatctgcc atcgtcacca accgtggcgg tcgtacctgt	1260

cacgcggcga tcacgctcg tgaactgggc attccggcgg tagtgggctg tggagatgca	1320
acagaacgga tgaaagacgg tgagaacgtc actgtttctt gtgccgaagg tgataccggt	1380
tacgtctatg cggagttgct ggaatttagc gtgaaaagct ccagcgtaga aacgatgccg	1440
gatctgccgt tgaaagtgat gatgaacgtc ggtaaccgg accgtgcttt cgacttcgcc	1500
tgcctaccga acgaaggcgt gggccttgcg cgtctggaat ttatcatcaa ccgtatgatt	1560
ggcgtccacc cacgcgcact gcttgagttt gacgatcagg aaccgcagtt gcaaaacgaa	1620
atccgcgaga tgatgaaagg ttttgattct ccgcgtgaat tttacgttgg tcgtctgact	1680
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tgtttcgcgc tggagtgtga agcagtgaag cgtgtgcgca acgacatggg actgaccaac	1920
gttgagatca tgatcccgtt cgtgcgtacc gtagatcagg cgaaagcggg ggttgaagaa	1980
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<210> 71
 <211> 792
 <212> PRT
 <213> Escherichia coli

<400> 71

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Gly	Met	Asn	Asp	Val	Asp	Arg	Val	Gly	Gly	Lys	Asn	Ala	Ser	Leu	Gly
			20					25					30		

Glu	Met	Ile	Thr	Asn	Leu	Ser	Gly	Met	Gly	Val	Ser	Val	Pro	Asn	Gly
		35					40					45			

Phe	Ala	Thr	Thr	Ala	Asp	Ala	Phe	Asn	Gln	Phe	Leu	Asp	Gln	Ser	Gly
	50					55					60				

Val	Asn	Gln	Arg	Ile	Tyr	Glu	Leu	Leu	Asp	Lys	Thr	Asp	Ile	Asp	Asp
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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

325

330

335

Pro Glu Thr Val Arg Ser Arg Gly Gln Val Met Glu Arg Tyr Thr Leu
 340 345 350

His Ser Gln Gly Lys Ile Ile Ala Glu Gly Arg Ala Ile Gly His Arg
 355 360 365

Ile Gly Ala Gly Pro Val Lys Val Ile His Asp Ile Ser Glu Met Asn
 370 375 380

Arg Ile Glu Pro Gly Asp Val Leu Val Thr Asp Met Thr Asp Pro Asp
 385 390 395 400

Trp Glu Pro Ile Met Lys Lys Ala Ser Ala Ile Val Thr Asn Arg Gly
 405 410 415

Gly Arg Thr Cys His Ala Ala Ile Ile Ala Arg Glu Leu Gly Ile Pro
 420 425 430

Ala Val Val Gly Cys Gly Asp Ala Thr Glu Arg Met Lys Asp Gly Glu
 435 440 445

Asn Val Thr Val Ser Cys Ala Glu Gly Asp Thr Gly Tyr Val Tyr Ala
 450 455 460

Glu Leu Leu Glu Phe Ser Val Lys Ser Ser Ser Val Glu Thr Met Pro
 465 470 475 480

Asp Leu Pro Leu Lys Val Met Met Asn Val Gly Asn Pro Asp Arg Ala
 485 490 495

Phe Asp Phe Ala Cys Leu Pro Asn Glu Gly Val Gly Leu Ala Arg Leu
 500 505 510

Glu Phe Ile Ile Asn Arg Met Ile Gly Val His Pro Arg Ala Leu Leu
 515 520 525

Glu Phe Asp Asp Gln Glu Pro Gln Leu Gln Asn Glu Ile Arg Glu Met
 530 535 540

Met Lys Gly Phe Asp Ser Pro Arg Glu Phe Tyr Val Gly Arg Leu Thr
 545 550 555 560

Glu Gly Ile Ala Thr Leu Gly Ala Ala Phe Tyr Pro Lys Arg Val Ile
 565 570 575

Val Arg Leu Ser Asp Phe Lys Ser Asn Glu Tyr Ala Asn Leu Val Gly

580

585

590

Gly Glu Arg Tyr Glu Pro Asp Glu Glu Asn Pro Met Leu Gly Phe Arg
595 600 605

Gly Ala Gly Arg Tyr Val Ser Asp Ser Phe Arg Asp Cys Phe Ala Leu
610 615 620

Glu Cys Glu Ala Val Lys Arg Val Arg Asn Asp Met Gly Leu Thr Asn
625 630 635 640

Val Glu Ile Met Ile Pro Phe Val Arg Thr Val Asp Gln Ala Lys Ala
645 650 655

Val Val Glu Glu Leu Ala Arg Gln Gly Leu Lys Arg Gly Glu Asn Gly
660 665 670

Leu Lys Ile Ile Met Met Cys Glu Ile Pro Ser Asn Ala Leu Leu Ala
675 680 685

Glu Gln Phe Leu Glu Tyr Phe Asp Gly Phe Ser Ile Gly Ser Asn Asp
690 695 700

Met Thr Gln Leu Ala Leu Gly Leu Asp Arg Asp Ser Gly Val Val Ser
705 710 715 720

Glu Leu Phe Asp Glu Arg Asn Asp Ala Val Lys Ala Leu Leu Ser Met
725 730 735

Ala Ile Arg Ala Ala Lys Lys Gln Gly Lys Tyr Val Gly Ile Cys Gly
740 745 750

Gln Gly Pro Ser Asp His Glu Asp Phe Ala Ala Trp Leu Met Glu Glu
755 760 765

Gly Ile Asp Ser Leu Ser Leu Asn Pro Asp Thr Val Val Gln Thr Trp
770 775 780

Leu Ser Leu Ala Glu Leu Lys Lys
785 790

<210> 72

<211> 1623

<212> DNA

<213> Escherichia coli

<400> 72

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catgatatcg tttaacaacc aagctacgac ctgctgtatc aggaagagct cgatccgagc 120

ctgacaggtt atgagcgcg	gggtgtaact aatctgggtg	ccgttgccgt cgataccggg	180
atcttcaccg gtcgttcacc	aaaagataag tatatcgtec	gtgacgatac cactcgcgat	240
actttctggt gggcagacaa	aggcaaaggt aagaacgaca	acaaacctct ctctccggaa	300
acctggcagc atctgaaagg	cctggtgacc aggcagcttt	ccggcaaacg tctgttcggt	360
gtcgacgctt tctgtggtgc	gaacccggat actcgtcttt	ccgtccgttt catcaccgaa	420
gtggcctggc aggcgcattt	tgtcaaaaac atgtttattc	gcccgagcga tgaagaactg	480
gcaggtttca aaccagactt	tatcgttatg aacggcgcg	agtgcactaa cccgcagtgg	540
aaagaacagg gtctcaactc	cgaaaacttc gtggcgttta	acctgaccga gcgcatgcag	600
ctgattggcg gcacctggta	cggcggcgaa atgaagaaag	ggatgttctc gatgatgaac	660
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atcgataaca ttgttaagcc	ggtttccaaa gcggggccacg	cgactaagggt tatcttcctg	1080
actgctgatg ctttcggcgt	gttgccgccg gtttctcgcc	tgactgccga tcaaaccag	1140
tatcacttcc tctctggctt	caccgccaaa ctggccggta	ctgagcgtgg catcaccgaa	1200
ccgacgccaa ctttctccgc	ttgcttcggc gcggcattcc	tgctcgctgca cccgactcag	1260
tacgcagaag tgctggtgaa	acgtatgcag gcggcgggcg	cgcaggctta tctggttaac	1320
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gccatcctca acggttcgct	ggataatgca gaaaccttca	ctctgccgat gtttaacctg	1440
gcgatcccaa ccgaactgcc	gggcgtagac acgaagattc	tcgatccgcg taacacctac	1500
gcttctccgg aacagtggca	ggaaaaagcc gaaaccttg	cgaaactgtt tatcgacaac	1560
ttcgataaat acaccgacac	ccctgcgggt gccgcgctg	tagcggctgg tccgaaactg	1620
taa			1623

<210> 73
 <211> 540
 <212> PRT
 <213> Escherichia coli

 <400> 73

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

Trp Asp Asp Asp Gly Val Phe Asn Phe Glu Gly Gly Cys Tyr Ala Lys
 275 280 285

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

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

Ile Asp Phe Asp Asp Gly Ser Lys Thr Glu Asn Thr Arg Val Ser Tyr
 325 330 335

Pro Ile Tyr His Ile Asp Asn Ile Val Lys Pro Val Ser Lys Ala Gly
 340 345 350

His Ala Thr Lys Val Ile Phe Leu Thr Ala Asp Ala Phe Gly Val Leu
 355 360 365

Pro Pro Val Ser Arg Leu Thr Ala Asp Gln Thr Gln Tyr His Phe Leu
 370 375 380

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

Pro Thr Pro Thr Phe Ser Ala Cys Phe Gly Ala Ala Phe Leu Ser Leu
 405 410 415

His Pro Thr Gln Tyr Ala Glu Val Leu Val Lys Arg Met Gln Ala Ala
 420 425 430

Gly Ala Gln Ala Tyr Leu Val Asn Thr Gly Trp Asn Gly Thr Gly Lys
 435 440 445

Arg Ile Ser Ile Lys Asp Thr Arg Ala Ile Ile Asp Ala Ile Leu Asn
 450 455 460

Gly Ser Leu Asp Asn Ala Glu Thr Phe Thr Leu Pro Met Phe Asn Leu
 465 470 475 480

Ala Ile Pro Thr Glu Leu Pro Gly Val Asp Thr Lys Ile Leu Asp Pro
 485 490 495

Arg Asn Thr Tyr Ala Ser Pro Glu Gln Trp Gln Glu Lys Ala Glu Thr
 500 505 510

Leu Ala Lys Leu Phe Ile Asp Asn Phe Asp Lys Tyr Thr Asp Thr Pro
 515 520 525

Ala	Gly	Ala	Ala	Leu	Val	Ala	Ala	Gly	Pro	Lys	Leu
530						535					540

<210> 74
 <211> 1443
 <212> DNA
 <213> *Escherichia coli*

<400> 74
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 cacggctcgc ctgaagatca caaaatgcgc gcggataaag ttcgtgagat tgccgcaaaa 180
 ctggggcgctc atgtggctat tctgggtgac ctccaggggc ccaaaatccg tgtatccacc 240
 tttaaagaag gcaaagtttt cctcaatatt ggggataaat tcctgctcga cgccaacctg 300
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 gtcgtgcctg gtgacatcct gctgctggac gatggtcgcg tccagttaaa agtactggaa 420
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 gacattaaga ctgcggcggtt gattggcgta gattacctgg ctgtctcctt cccacgctgt 600
 ggcgaagatc tgaactatgc ccgtcgcctg gcacgcgatg caggatgtga tgcgaaaatt 660
 gttgccaaagg ttgaacgtgc ggaagccgtt tgcagccagg atgcaatgga tgacatcatc 720
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 ggtctgccaa ttttcgccat gtcgcgccat gaacgtacgc tgaacctgac tgctctctat 1260
 cgtggcggtta cgccggtgca ctttgatagc gctaatacgc gcgtagcagc tgccagcgaa 1320
 gcggttaatc tgctgcgcga taaaggttac ttgatgtctg gtgacctggt gattgtcacc 1380
 cagggcgacg tgatgagtac cgtgggttct actaatacca cgcgtatttt aacggtagag 1440
 taa 1443

<210> 75
 <211> 480

<212> PRT

<213> Escherichia coli

<400> 75

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

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

Val Ala Ile Leu Gly Asp Leu Gln Gly Pro Lys Ile Arg Val Ser Thr
65 70 75 80

Phe Lys Glu Gly Lys Val Phe Leu Asn Ile Gly Asp Lys Phe Leu Leu
85 90 95

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

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

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

Lys Val Phe Thr Glu Val Thr Val Gly Gly Pro Leu Ser Asn Asn Lys
145 150 155 160

Gly Ile Asn Lys Leu Gly Gly Gly Leu Ser Ala Glu Ala Leu Thr Glu
165 170 175

Lys Asp Lys Ala Asp Ile Lys Thr Ala Ala Leu Ile Gly Val Asp Tyr
180 185 190

Leu Ala Val Ser Phe Pro Arg Cys Gly Glu Asp Leu Asn Tyr Ala Arg
195 200 205

Arg Leu Ala Arg Asp Ala Gly Cys Asp Ala Lys Ile Val Ala Lys Val
210 215 220

Glu Arg Ala Glu Ala Val Cys Ser Gln Asp Ala Met Asp Asp Ile Ile
225 230 235 240

Leu Ala Ser Asp Val Val Met Val Ala Arg Gly Asp Leu Gly Val Glu
 245 250 255
 Ile Gly Asp Pro Glu Leu Val Gly Ile Gln Lys Ala Leu Ile Arg Arg
 260 265 270
 Ala Arg Gln Leu Asn Arg Ala Val Ile Thr Ala Thr Gln Met Met Glu
 275 280 285
 Ser Met Ile Thr Asn Pro Met Pro Thr Arg Ala Glu Val Met Asp Val
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 Ala Asn Ala Val Leu Asp Gly Thr Asp Ala Val Met Leu Ser Ala Glu
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 Thr Ala Ala Gly Gln Tyr Pro Ser Glu Thr Val Ala Ala Met Ala Arg
 325 330 335
 Val Cys Leu Gly Ala Glu Lys Ile Pro Ser Ile Asn Val Ser Lys His
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 Arg Leu Asp Val Gln Phe Asp Asn Val Glu Glu Ala Ile Ala Met Ser
 355 360 365
 Ala Met Tyr Ala Ala Asn His Leu Lys Gly Val Thr Ala Ile Ile Thr
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 Met Thr Glu Ser Gly Arg Thr Ala Leu Met Thr Ser Arg Ile Ser Ser
 385 390 395 400
 Gly Leu Pro Ile Phe Ala Met Ser Arg His Glu Arg Thr Leu Asn Leu
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 Thr Ala Leu Tyr Arg Gly Val Thr Pro Val His Phe Asp Ser Ala Asn
 420 425 430
 Asp Gly Val Ala Ala Ala Ser Glu Ala Val Asn Leu Leu Arg Asp Lys
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 Gly Tyr Leu Met Ser Gly Asp Leu Val Ile Val Thr Gln Gly Asp Val
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<210> 76
 <211> 1413
 <212> DNA

<213> Escherichia coli

<400> 76

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<210> 77

<211> 470

<212> PRT

<213> Escherichia coli

<400> 77

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20

25

30

Leu Asn Phe Ser His Gly Asp Tyr Ala Glu His Gly Gln Arg Ile Gln
 35 40 45

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

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

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

Lys Ser Val Ile Gly Asn Ser Glu Met Val Ala Val Thr Tyr Glu Gly
 100 105 110

Phe Thr Thr Asp Leu Ser Val Gly Asn Thr Val Leu Val Asp Asp Gly
 115 120 125

Leu Ile Gly Met Glu Val Thr Ala Ile Glu Gly Asn Lys Val Ile Cys
 130 135 140

Lys Val Leu Asn Asn Gly Asp Leu Gly Glu Asn Lys Gly Val Asn Leu
 145 150 155 160

Pro Gly Val Ser Ile Ala Leu Pro Ala Leu Ala Glu Lys Asp Lys Gln
 165 170 175

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

Phe Ile Arg Lys Arg Ser Asp Val Ile Glu Ile Arg Glu His Leu Lys
 195 200 205

Ala His Gly Gly Glu Asn Ile His Ile Ile Ser Lys Ile Glu Asn Gln
 210 215 220

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

Met Val Ala Arg Gly Asp Leu Gly Val Glu Ile Pro Val Glu Glu Val
 245 250 255

Ile Phe Ala Gln Lys Met Met Ile Glu Lys Cys Ile Arg Ala Arg Lys
 260 265 270

Val Val Ile Thr Ala Thr Gln Met Leu Asp Ser Met Ile Lys Asn Pro

275

280

285

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

Gly Thr Asp Ala Val Met Leu Ser Gly Glu Ser Ala Lys Gly Lys Tyr
 305 310 315 320

Pro Leu Glu Ala Val Ser Ile Met Ala Thr Ile Cys Glu Arg Thr Asp
 325 330 335

Arg Val Met Asn Ser Arg Leu Glu Phe Asn Asn Asp Asn Arg Lys Leu
 340 345 350

Arg Ile Thr Glu Ala Val Cys Arg Gly Ala Val Glu Thr Ala Glu Lys
 355 360 365

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

Arg Ala Val Arg Lys Tyr Phe Pro Asp Ala Thr Ile Leu Ala Leu Thr
 385 390 395 400

Thr Asn Glu Lys Thr Ala His Gln Leu Val Leu Ser Lys Gly Val Val
 405 410 415

Pro Gln Leu Val Lys Glu Ile Thr Ser Thr Asp Asp Phe Tyr Arg Leu
 420 425 430

Gly Lys Glu Leu Ala Leu Gln Ser Gly Leu Ala His Lys Gly Asp Val
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Val Val Met Val Ser Gly Ala Leu Val Pro Ser Gly Thr Thr Asn Thr
 450 455 460

Ala Ser Val His Val Leu
 465 470

<210> 78

<211> 1410

<212> DNA

<213> Escherichia coli

<400> 78

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<210> 79

<211> 469

<212> PRT

<213> Escherichia coli

<400> 79

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			20					25					30		

Thr	Ile	Pro	Ala	His	Gln	Val	Asn	Ala	Glu	Phe	Phe	Glu	Glu	Gly	Lys
		35					40					45			

Met	Phe	Asp	Gly	Ser	Ser	Ile	Gly	Gly	Trp	Lys	Gly	Ile	Asn	Glu	Ser
	50					55					60				

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

Lys Arg Leu Val Pro Gly Tyr Glu Ala Pro Val Met Leu Ala Tyr Ser
325 330 335

Ala Arg Asn Arg Ser Ala Ser Ile Arg Ile Pro Val Val Ser Ser Pro
340 345 350

Lys Ala Arg Arg Ile Glu Val Arg Phe Pro Asp Pro Ala Ala Asn Pro
355 360 365

Tyr Leu Cys Phe Ala Ala Leu Leu Met Ala Gly Leu Asp Gly Ile Lys
370 375 380

Asn Lys Ile His Pro Gly Glu Ala Met Asp Lys Asn Leu Tyr Asp Leu
385 390 395 400

Pro Pro Glu Glu Ala Lys Glu Ile Pro Gln Val Ala Gly Ser Leu Glu
405 410 415

Glu Ala Leu Asn Glu Leu Asp Leu Asp Arg Glu Phe Leu Lys Ala Gly
420 425 430

Gly Val Phe Thr Asp Glu Ala Ile Asp Ala Tyr Ile Ala Leu Arg Arg
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Glu Glu Asp Asp Arg Val Arg Met Thr Pro His Pro Val Glu Phe Glu
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Leu Tyr Tyr Ser Val
465

<210> 80

<211> 4461

<212> DNA

<213> Escherichia coli

<400> 80

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<210> 81
 <211> 1486
 <212> PRT
 <213> Escherichia coli

<400> 81

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Ile His Ala Leu Ala Arg Met Gln His Arg Gly Ala Ile Leu Ala Asp
 35 40 45

Gly Lys Thr Gly Asp Gly Cys Gly Leu Leu Leu Gln Lys Pro Asp Arg
 50 55 60

Phe Phe Arg Ile Val Ala Gln Glu Arg Gly Trp Arg Leu Ala Lys Asn
 65 70 75 80

Tyr Ala Val Gly Met Leu Phe Leu Asn Lys Asp Pro Glu Leu Ala Ala
 85 90 95

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

Ile Val Gly Trp Arg Asp Val Pro Thr Asn Glu Gly Val Leu Gly Glu
 115 120 125

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

Pro Ala Gly Trp Arg Pro Arg Asp Met Glu Arg Arg Leu Phe Ile Ala
 145 150 155 160

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

Cys Ser Leu Ser Asn Leu Val Asn Ile Tyr Lys Gly Leu Cys Met Pro
 180 185 190

Thr Asp Leu Pro Arg Phe Tyr Leu Asp Leu Ala Asp Leu Arg Leu Glu
 195 200 205

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

Ala	Glu	Glu	Leu	Asp	Ser	Val	Ile	Arg	Val	Leu	Gly	Glu	Asn	Gly	Gln	465	470	475	480
Glu	Ala	Val	Gly	Ser	Met	Gly	Asp	Asp	Thr	Pro	Phe	Ala	Val	Leu	Ser	485	490		495
Ser	Gln	Pro	Arg	Ile	Ile	Tyr	Asp	Tyr	Phe	Arg	Gln	Gln	Phe	Ala	Gln	500	505		510
Val	Thr	Asn	Pro	Pro	Ile	Asp	Pro	Leu	Arg	Glu	Ala	His	Val	Met	Ser	515	520		525
Leu	Ala	Thr	Ser	Ile	Gly	Arg	Glu	Met	Asn	Val	Phe	Cys	Glu	Ala	Glu	530	535		540
Gly	Gln	Ala	His	Arg	Leu	Ser	Phe	Lys	Ser	Pro	Ile	Leu	Leu	Tyr	Ser	545	550	555	560
Asp	Phe	Lys	Gln	Leu	Thr	Thr	Met	Lys	Glu	Glu	His	Tyr	Arg	Ala	Asp	565	570		575
Thr	Leu	Asp	Ile	Thr	Phe	Asp	Val	Thr	Lys	Thr	Thr	Leu	Glu	Ala	Thr	580	585		590
Val	Lys	Glu	Leu	Cys	Asp	Lys	Ala	Glu	Lys	Met	Val	Arg	Ser	Gly	Thr	595	600		605
Val	Leu	Leu	Val	Leu	Ser	Asp	Arg	Asn	Ile	Ala	Lys	Asp	Arg	Leu	Pro	610	615	620	
Val	Pro	Ala	Pro	Met	Ala	Val	Gly	Ala	Ile	Gln	Thr	Arg	Leu	Val	Asp	625	630	635	640
Gln	Ser	Leu	Arg	Cys	Asp	Ala	Asn	Ile	Ile	Val	Glu	Thr	Ala	Ser	Ala	645	650		655
Arg	Asp	Pro	His	His	Phe	Ala	Val	Leu	Leu	Gly	Phe	Gly	Ala	Thr	Ala	660	665		670
Ile	Tyr	Pro	Tyr	Leu	Ala	Tyr	Glu	Thr	Leu	Gly	Arg	Leu	Val	Asp	Thr	675	680		685
His	Ala	Ile	Ala	Lys	Asp	Tyr	Arg	Thr	Val	Met	Leu	Asn	Tyr	Arg	Asn	690	695	700	
Gly	Ile	Asn	Lys	Gly	Leu	Tyr	Lys	Ile	Met	Ser	Lys	Met	Gly	Ile	Ser	705	710	715	720

Thr	Ile	Ala	Ser	Tyr	Arg	Cys	Ser	Lys	Leu	Phe	Glu	Ala	Val	Gly	Leu	725	730	735	
His	Asp	Asp	Val	Val	Gly	Leu	Cys	Phe	Gln	Gly	Ala	Val	Ser	Arg	Ile	740	745	750	
Gly	Gly	Ala	Ser	Phe	Glu	Asp	Phe	Gln	Gln	Asp	Leu	Leu	Asn	Leu	Ser	755	760	765	
Lys	Arg	Ala	Trp	Leu	Ala	Arg	Lys	Pro	Ile	Ser	Gln	Gly	Gly	Leu	Leu	770	775	780	
Lys	Tyr	Val	His	Gly	Gly	Glu	Tyr	His	Ala	Tyr	Asn	Pro	Asp	Val	Val	785	790	795	800
Arg	Thr	Leu	Gln	Gln	Ala	Val	Gln	Ser	Gly	Glu	Tyr	Ser	Asp	Tyr	Gln	805	810	815	
Glu	Tyr	Ala	Lys	Leu	Val	Asn	Glu	Arg	Pro	Ala	Thr	Thr	Leu	Arg	Asp	820	825	830	
Leu	Leu	Ala	Ile	Thr	Pro	Gly	Glu	Asn	Ala	Val	Asn	Ile	Ala	Asp	Val	835	840	845	
Glu	Pro	Ala	Ser	Glu	Leu	Phe	Lys	Arg	Phe	Asp	Thr	Ala	Ala	Met	Ser	850	855	860	
Ile	Gly	Ala	Leu	Ser	Pro	Glu	Ala	His	Glu	Ala	Leu	Ala	Glu	Ala	Met	865	870	875	880
Asn	Ser	Ile	Gly	Gly	Asn	Ser	Asn	Ser	Gly	Glu	Gly	Gly	Glu	Asp	Pro	885	890	895	
Ala	Arg	Tyr	Gly	Thr	Asn	Lys	Val	Ser	Arg	Ile	Lys	Gln	Val	Ala	Ser	900	905	910	
Gly	Arg	Phe	Gly	Val	Thr	Pro	Ala	Tyr	Leu	Val	Asn	Ala	Asp	Val	Ile	915	920	925	
Gln	Ile	Lys	Val	Ala	Gln	Gly	Ala	Lys	Pro	Gly	Glu	Gly	Gly	Gln	Leu	930	935	940	
Pro	Gly	Asp	Lys	Val	Thr	Pro	Tyr	Ile	Ala	Lys	Leu	Arg	Tyr	Ser	Val	945	950	955	960
Pro	Gly	Val	Thr	Leu	Ile	Ser	Pro	Pro	Pro	His	His	Asp	Ile	Tyr	Ser	965	970	975	

Ile Glu Asp Leu Ala Gln Leu Ile Phe Asp Leu Lys Gln Val Asn Pro
980 985 990

Lys Ala Met Ile Ser Val Lys Leu Val Ser Glu Pro Gly Val Gly Thr
995 1000 1005

Ile Ala Thr Gly Val Ala Lys Ala Tyr Ala Asp Leu Ile Thr Ile
1010 1015 1020

Ala Gly Tyr Asp Gly Gly Thr Gly Ala Ser Pro Leu Ser Ser Val
1025 1030 1035

Lys Tyr Ala Gly Cys Pro Trp Glu Leu Gly Leu Val Glu Thr Gln
1040 1045 1050

Gln Ala Leu Val Ala Asn Gly Leu Arg His Lys Ile Arg Leu Gln
1055 1060 1065

Val Asp Gly Gly Leu Lys Thr Gly Val Asp Ile Ile Lys Ala Ala
1070 1075 1080

Ile Leu Gly Ala Glu Ser Phe Gly Phe Gly Thr Gly Pro Met Val
1085 1090 1095

Ala Leu Gly Cys Lys Tyr Leu Arg Ile Cys His Leu Asn Asn Cys
1100 1105 1110

Ala Thr Gly Val Ala Thr Gln Asp Asp Lys Leu Arg Lys Asn His
1115 1120 1125

Tyr His Gly Leu Pro Phe Lys Val Thr Asn Tyr Phe Glu Phe Ile
1130 1135 1140

Ala Arg Glu Thr Arg Glu Leu Met Ala Gln Leu Gly Val Thr Arg
1145 1150 1155

Leu Val Asp Leu Ile Gly Arg Thr Asp Leu Leu Lys Glu Leu Asp
1160 1165 1170

Gly Phe Thr Ala Lys Gln Gln Lys Leu Ala Leu Ser Lys Leu Leu
1175 1180 1185

Glu Thr Ala Glu Pro His Pro Gly Lys Ala Leu Tyr Cys Thr Glu
1190 1195 1200

Asn Asn Pro Pro Phe Asp Asn Gly Leu Leu Asn Ala Gln Leu Leu
1205 1210 1215

Gln	Gln	Ala	Lys	Pro	Phe	Val	Asp	Glu	Arg	Gln	Ser	Lys	Thr	Phe
1220						1225					1230			
Trp	Phe	Asp	Ile	Arg	Asn	Thr	Asp	Arg	Ser	Val	Gly	Ala	Ser	Leu
1235						1240					1245			
Ser	Gly	Tyr	Ile	Ala	Gln	Thr	His	Gly	Asp	Gln	Gly	Leu	Ala	Ala
1250						1255					1260			
Asp	Pro	Ile	Lys	Ala	Tyr	Phe	Asn	Gly	Thr	Ala	Gly	Gln	Ser	Phe
1265						1270					1275			
Gly	Val	Trp	Asn	Ala	Gly	Gly	Val	Glu	Leu	Tyr	Leu	Thr	Gly	Asp
1280						1285					1290			
Ala	Asn	Asp	Tyr	Val	Gly	Lys	Gly	Met	Ala	Gly	Gly	Leu	Ile	Ala
1295						1300					1305			
Ile	Arg	Pro	Pro	Val	Gly	Ser	Ala	Phe	Arg	Ser	His	Glu	Ala	Ser
1310						1315					1320			
Ile	Ile	Gly	Asn	Thr	Cys	Leu	Tyr	Gly	Ala	Thr	Gly	Gly	Arg	Leu
1325						1330					1335			
Tyr	Ala	Ala	Gly	Arg	Ala	Gly	Glu	Arg	Phe	Gly	Val	Arg	Asn	Ser
1340						1345					1350			
Gly	Ala	Ile	Thr	Val	Val	Glu	Gly	Ile	Gly	Asp	Asn	Gly	Cys	Glu
1355						1360					1365			
Tyr	Met	Thr	Gly	Gly	Ile	Val	Cys	Ile	Leu	Gly	Lys	Thr	Gly	Val
1370						1375					1380			
Asn	Phe	Gly	Ala	Gly	Met	Thr	Gly	Gly	Phe	Ala	Tyr	Val	Leu	Asp
1385						1390					1395			
Glu	Ser	Gly	Asp	Phe	Arg	Lys	Arg	Val	Asn	Pro	Glu	Leu	Val	Glu
1400						1405					1410			
Val	Leu	Ser	Val	Asp	Ala	Leu	Ala	Ile	His	Glu	Glu	His	Leu	Arg
1415						1420					1425			
Gly	Leu	Ile	Thr	Glu	His	Val	Gln	His	Thr	Gly	Ser	Gln	Arg	Gly
1430						1435					1440			
Glu	Glu	Ile	Leu	Ala	Asn	Trp	Ser	Thr	Phe	Ala	Thr	Lys	Phe	Ala
1445						1450					1455			

Leu Val Lys Pro Lys Ser Ser Asp Val Lys Ala Leu Leu Gly His
1460 1465 1470

Arg Ser Arg Ser Ala Ala Glu Leu Arg Val Gln Ala Gln
1475 1480 1485

<210> 82
<211> 1419
<212> DNA
<213> Escherichia coli

<400> 82
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ctgaagatcc gcaaaattga gtttggtgaa atttacgagc cgttttccga aggccaggcc 120
aaagcgcagg ctgaccgctg cctgtcgtgc ggcaacccat actgcgagtg gaaatgcccg 180
gtacacaaact acatcccga ctggctgaag ctgcgcaacg aggggcgtat ttttgaagcg 240
gcggaactgt cgcaccagac caacaccctg ccggaagttt gcggacgagt ctgcccgcaa 300
gaccgtctgt gcgaaggttc ctgcaactctg aacgatgagt ttggcgcggt gaccatcggc 360
aacattgagc gctatatcaa cgataaagcg ttcgagatgg gctggcgctc ggatatgtct 420
gggtgtgaaac agaccggtaa aaaagtggcg attatcggcg caggcccggc aggtctggcg 480
tgtgcggatg tcctgacgcg taacggcgta aaagccgttg tcttcgaccg tcatccagaa 540
attggcgggc tgctgacctt cgggtattccg gccttcaagc tggaaaaaga ggtaatgacg 600
cgtcgccgtg aaatcttcac cggcatgggt attgaattca aactcaatac cgaagtgggc 660
cgcgacgtac agctggacga tctgctgagt gattacgatg ccgtgttcct tggcgtcggg 720
acttatcagt caatgcgcgg cgggctggaa aacgaagacg ccgatggcgt gtacgcagcg 780
ctgccgttcc tcatcgccaa caccaaacag ttaatgggct ttggtgaaac ccgcgacgaa 840
ccgttcgtca gcatggaagg caaacgcgtg gtggtccttg gcggtggcga cactgcgatg 900
gactgcgtgc gtacgtccgt gcgccaggga gcgaagcacg ttacctgtgc ctatcgtcgt 960
gatgaagaga acatgccggg ttcccggcgc gaagtgaaaa acgcgcggga agaaggcgta 1020
gagttcaaat tcaacgtcca gccgctgggt attgaagtga acggtaacgg caaagtcagc 1080
ggcgtaaaaa tgggtgcgtac cgaaatgggc gaaccggacg ccaaaggccg tcgccgcgcg 1140
gagatcgttg caggttccga acatatcggt ccggcagatg cggatgatcat ggcgtttggg 1200
ttcgtccac acaacatgga atggctggca aaacacagcg tcgagctgga ttcacaaggc 1260
cgcatcatcg ccccggaagg cagcgacaac gccttccaga ccagcaaccg gaaaatcttt 1320
gctggcggcg atatcgtccg tggttccgat ctggtggtga ccgctattgc cgaaggtcgt 1380
aaggcggcag acgggtattat gaactggctg gaagtttaa 1419

<210> 83
<211> 472
<212> PRT
<213> Escherichia coli

<400> 83

Met Ser Gln Asn Val Tyr Gln Phe Ile Asp Leu Gln Arg Val Asp Pro
1 5 10 15

Pro Lys Lys Pro Leu Lys Ile Arg Lys Ile Glu Phe Val Glu Ile Tyr
20 25 30

Glu Pro Phe Ser Glu Gly Gln Ala Lys Ala Gln Ala Asp Arg Cys Leu
35 40 45

Ser Cys Gly Asn Pro Tyr Cys Glu Trp Lys Cys Pro Val His Asn Tyr
50 55 60

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

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

Val Cys Pro Gln Asp Arg Leu Cys Glu Gly Ser Cys Thr Leu Asn Asp
100 105 110

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

Lys Ala Phe Glu Met Gly Trp Arg Pro Asp Met Ser Gly Val Lys Gln
130 135 140

Thr Gly Lys Lys Val Ala Ile Ile Gly Ala Gly Pro Ala Gly Leu Ala
145 150 155 160

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

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

Lys Leu Glu Lys Glu Val Met Thr Arg Arg Arg Glu Ile Phe Thr Gly
195 200 205

Met Gly Ile Glu Phe Lys Leu Asn Thr Glu Val Gly Arg Asp Val Gln
210 215 220

Leu Asp Asp Leu Leu Ser Asp Tyr Asp Ala Val Phe Leu Gly Val Gly

225		230		235		240
Thr Tyr Gln Ser Met Arg Gly Gly Leu Glu Asn Glu Asp Ala Asp Gly	245			250		255
Val Tyr Ala Ala Leu Pro Phe Leu Ile Ala Asn Thr Lys Gln Leu Met	260			265		270
Gly Phe Gly Glu Thr Arg Asp Glu Pro Phe Val Ser Met Glu Gly Lys	275			280		285
Arg Val Val Val Leu Gly Gly Gly Asp Thr Ala Met Asp Cys Val Arg	290			295		300
Thr Ser Val Arg Gln Gly Ala Lys His Val Thr Cys Ala Tyr Arg Arg	305			310		315
Asp Glu Glu Asn Met Pro Gly Ser Arg Arg Glu Val Lys Asn Ala Arg	325			330		335
Glu Glu Gly Val Glu Phe Lys Phe Asn Val Gln Pro Leu Gly Ile Glu	340			345		350
Val Asn Gly Asn Gly Lys Val Ser Gly Val Lys Met Val Arg Thr Glu	355			360		365
Met Gly Glu Pro Asp Ala Lys Gly Arg Arg Arg Ala Glu Ile Val Ala	370			375		380
Gly Ser Glu His Ile Val Pro Ala Asp Ala Val Ile Met Ala Phe Gly	385			390		395
Phe Arg Pro His Asn Met Glu Trp Leu Ala Lys His Ser Val Glu Leu	405			410		415
Asp Ser Gln Gly Arg Ile Ile Ala Pro Glu Gly Ser Asp Asn Ala Phe	420			425		430
Gln Thr Ser Asn Pro Lys Ile Phe Ala Gly Gly Asp Ile Val Arg Gly	435			440		445
Ser Asp Leu Val Val Thr Ala Ile Ala Glu Gly Arg Lys Ala Ala Asp	450			455		460
Gly Ile Met Asn Trp Leu Glu Val	465			470		

<211> 1665
<212> DNA
<213> Escherichia coli

<400> 84
atgtgttcaa tttttggcgt attcgatatc aaaacagacg cagttgagct gcgtaagaaa 60
gccctcgagc tgtcacgcct gatgcgtcat cgtggcccgg actgggtccg tatttatgcc 120
agcgataacg ccattctcgc ccacgaacgt ctgtcaattg ttgacgttaa cgcgggggag 180
caacctctct acaaccaaca aaaaacccac gtactggcgg taaacggtga aatctacaac 240
caccaggcat tgcgcgccga atatggcgat cgttaccagt tccagaccgg gtctgactgt 300
gaagtgatcc tcgcgctgta tcaggaaaaa gggccggaat ttctcgacga cttgcagggc 360
atgtttgcct ttgcaactgta cgacagcgaa aaagatgcct acctgattgg tcgcgaccat 420
ctgggggatca tcccactgta tatggggtat gacgaacacg gtcagctgta tgtggcctca 480
gaaatgaaag cgctgggtgcc agtttgccgc acgattaaag agttcccggc ggggagctat 540
ttgtggagcc aggacggcga aatccgttct tactatcatc gcgactggtt cgactacgat 600
gcggtgaaag ataacgtgac cgacaaaaac gagctgcgtc aggcactgga agattcagtt 660
aaaagccatc tgatgtctga tgtgccttac ggtgtgctgc tttctggtgg tctggattcc 720
tcaattatth ccgctatcac caagaaatac gcagcccgtc gcgtggaaga tcaggaacgc 780
tctgaagcct ggtggccgca gttacactcc tttgctgtag gtctgccggg ttcaccggat 840
ctgaaagcag cccaggaagt ggcaaaccat ctgggcacgg tgcatcacga aattcacttc 900
actgtacagg aaggtctgga tgccatccgc gacgtgattt accacatcga aacttatgat 960
gtgaccacta ttcgcgcttc aacaccgatg tatttaaatgt cgcgtaagat caaggcgatg 1020
ggcattaaaa tgggtgctgtc cgggtgaagg tctgatgaag tggtcggcgg ttatctttac 1080
ttccacaaag caccgaatgc caaagaactg catgaagaga cgggtgcgta actgctggcc 1140
ctgcatatgt atgactgcgc gcgtgccaac aaagcgatgt cagcctgggg cgtggaagca 1200
cgcgttccgt tcctcgacaa aaaattcctt gatgtggcga tgcgtattaa cccacaggat 1260
aaaatgtgcg gtaacggcaa aatggaaaaa cacatcctgc gtgaatgttt tgaagcgtat 1320
ctgcctgcaa gcgtggcctg gcggcagaaa gagcagttct ccgatggcgt cggttacagt 1380
tggtatcgaca ccctgaaaga agtggctgcg cagcaggttt ctgatcagca actggaaact 1440
gcccgccttc gcttcccgtc caacacgcc aacctctaaag aagcgtactt gtatcgggag 1500
atctttgaag aactattccc gcttccgagc gccgctgagt gcgtgccggg cggtccttcc 1560
gtcgccttgtt cttccgctaa agcgatcgaa tgggatgaag cgttcaagaa aatggacgat 1620
ccgtctgggtc gcgcgggttg tgttcaccag tcggcgata agtaa 1665

<210> 85
<211> 554

<212> PRT

<213> Escherichia coli

<400> 85

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

Leu Arg Lys Lys Ala Leu Glu Leu Ser Arg Leu Met Arg His Arg Gly
20 25 30

Pro Asp Trp Ser Gly Ile Tyr Ala Ser Asp Asn Ala Ile Leu Ala His
35 40 45

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

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

His Gln Ala Leu Arg Ala Glu Tyr Gly Asp Arg Tyr Gln Phe Gln Thr
85 90 95

Gly Ser Asp Cys Glu Val Ile Leu Ala Leu Tyr Gln Glu Lys Gly Pro
100 105 110

Glu Phe Leu Asp Asp Leu Gln Gly Met Phe Ala Phe Ala Leu Tyr Asp
115 120 125

Ser Glu Lys Asp Ala Tyr Leu Ile Gly Arg Asp His Leu Gly Ile Ile
130 135 140

Pro Leu Tyr Met Gly Tyr Asp Glu His Gly Gln Leu Tyr Val Ala Ser
145 150 155 160

Glu Met Lys Ala Leu Val Pro Val Cys Arg Thr Ile Lys Glu Phe Pro
165 170 175

Ala Gly Ser Tyr Leu Trp Ser Gln Asp Gly Glu Ile Arg Ser Tyr Tyr
180 185 190

His Arg Asp Trp Phe Asp Tyr Asp Ala Val Lys Asp Asn Val Thr Asp
195 200 205

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

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

Ser Ile Ile Ser Ala Ile Thr Lys Lys Tyr Ala Ala Arg Arg Val Glu
 245 250 255

Asp Gln Glu Arg Ser Glu Ala Trp Trp Pro Gln Leu His Ser Phe Ala
 260 265 270

Val Gly Leu Pro Gly Ser Pro Asp Leu Lys Ala Ala Gln Glu Val Ala
 275 280 285

Asn His Leu Gly Thr Val His His Glu Ile His Phe Thr Val Gln Glu
 290 295 300

Gly Leu Asp Ala Ile Arg Asp Val Ile Tyr His Ile Glu Thr Tyr Asp
 305 310 315 320

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

Ile Lys Ala Met Gly Ile Lys Met Val Leu Ser Gly Glu Gly Ser Asp
 340 345 350

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

Glu Leu His Glu Glu Thr Val Arg Lys Leu Leu Ala Leu His Met Tyr
 370 375 380

Asp Cys Ala Arg Ala Asn Lys Ala Met Ser Ala Trp Gly Val Glu Ala
 385 390 395 400

Arg Val Pro Phe Leu Asp Lys Lys Phe Leu Asp Val Ala Met Arg Ile
 405 410 415

Asn Pro Gln Asp Lys Met Cys Gly Asn Gly Lys Met Glu Lys His Ile
 420 425 430

Leu Arg Glu Cys Phe Glu Ala Tyr Leu Pro Ala Ser Val Ala Trp Arg
 435 440 445

Gln Lys Glu Gln Phe Ser Asp Gly Val Gly Tyr Ser Trp Ile Asp Thr
 450 455 460

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

Ala Arg Phe Arg Phe Pro Tyr Asn Thr Pro Thr Ser Lys Glu Ala Tyr
 485 490 495

Leu Tyr Arg Glu Ile Phe Glu Glu Leu Phe Pro Leu Pro Ser Ala Ala
500 505 510

Glu Cys Val Pro Gly Gly Pro Ser Val Ala Cys Ser Ser Ala Lys Ala
515 520 525

Ile Glu Trp Asp Glu Ala Phe Lys Lys Met Asp Asp Pro Ser Gly Arg
530 535 540

Ala Val Gly Val His Gln Ser Ala Tyr Lys
545 550

<210> 86
<211> 933
<212> DNA
<213> Escherichia coli

<400> 86
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cttaacggcg gacaaaatgc cgattacatt ccctttcttg cgaatgtacc aggtcaactg 120
gcggcagtgg ctatcgtgac ctgcgatggc aacgtctata gtgcgggtga cagtgattac 180
cgctttgcac tggaatccat ctcgaaagtc tgtacgtag cccttgcggt agaagatgtc 240
ggcccgaggc cggtacagga caaaattggc gctgaccgca ccggattgcc ctttaactca 300
gttatcgctt tagagttgca tggcggcaaa ccgctttcgc cactggtaaa tgctggcgct 360
attgccacca ccagcctgat taacgctgaa aatgttgaac aacgctggca gcgaatttta 420
catatccaac agcaactggc tggcgagcag gtagcgctct ctgacgaagt caaccagtcg 480
gaacaaacaa ccaacttcca taaccggggc atagcctggc tgctgtactc cgccggatat 540
ctctattgtg atgcaatgga agcctgtgac gtgtataccc gtcagtgtc cagctcctc 600
aatactattg aactggcaac gcttggcgcg acgctggcgg caggtggtgt gaatccgttg 660
acgcataaac gcgttcttca ggccgacaac gtgccgtaca ttctggccga aatgatgatg 720
gaagggtgt atggtcgctc cggtgactgg gcgtatcgtg ttggtttacc gggcaaaagc 780
ggtgtaggtg gcggtattct ggcggtcgtc cctggagtga tgggaattgc cgcgttctca 840
ccaccgctgg acgaagatgg caacagtgtt cgcgggtcaaa aaatggtggc atcggtcgct 900
aagcaactcg gctataacgt gtttaagggc tga 933

<210> 87
<211> 310
<212> PRT
<213> Escherichia coli

<400> 87

Met Leu Asp Ala Asn Lys Leu Gln Gln Ala Val Asp Gln Ala Tyr Thr

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

260

265

270

Val Met Gly Ile Ala Ala Phe Ser Pro Pro Leu Asp Glu Asp Gly Asn
 275 280 285

Ser Val Arg Gly Gln Lys Met Val Ala Ser Val Ala Lys Gln Leu Gly
 290 295 300

Tyr Asn Val Phe Lys Gly
 305 310

<210> 88

<211> 927

<212> DNA

<213> Escherichia coli

<400> 88

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 ttggggattg ctatctgtac cgttgacgga cagctttttc aggccggaga cgcgcaagaa 180
 cgtttttcca ttcagtctat ttccaaagtg ctgagtctcg ttgtcgccat gcgtcattac 240
 tccgaagagg aaatctggca acgcgtcggc aaagatccgt ctggatcacc gttcaattcc 300
 ttagtgcaac tggaaatgga gcaggggtata ccgcgtaatc cggttcattaa tgccgggtgcg 360
 ctggtggtct gcgatatgtt gcaagggcga ttaagcgcac cacggcaacg tatgctggaa 420
 gtcgtgcgcg gcttaagcgg tgtgtctgat atttcctacg atacggtggt agcgcgttcc 480
 gaatttgaac attccgcgcg aaatgcggct atcgctggc tgatgaagtc gtttggcaat 540
 ttccatcatg acgtgacaac cgttctgcaa aactactttc attactgcgc tctgaaaatg 600
 agctgtgtag agctggcccg gacgtttgtc tttctggcta atcaggggaa agctattcat 660
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 ggcgttggtg gcggtattgt ggcgattgtt ccgcatgaaa tggccatcgc tgtctggagt 840
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<210> 89

<211> 927

<212> PRT

<213> Escherichia coli

<400> 89

Gly Thr Gly Gly Cys Ala Gly Thr Cys Gly Cys Cys Ala Thr Gly Gly
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 20 25 30

Ala Ala Ala Cys Ala Thr Cys Thr Thr Gly Cys Gly Gly Cys Ala Ala
 35 40 45

Gly Thr Gly Cys Gly Gly Cys Cys Gly Cys Thr Cys Ala Thr Thr Gly
 50 55 60

Gly Thr Cys Ala Gly Gly Gly Thr Ala Ala Ala Gly Thr Cys Gly Cys
 65 70 75 80

Gly Gly Ala Thr Thr Ala Thr Ala Thr Thr Cys Cys Gly Gly Cys Gly
 85 90 95

Cys Thr Gly Gly Cys Thr Ala Cys Ala Gly Thr Ala Gly Ala Cys Gly
 100 105 110

Gly Thr Thr Cys Cys Cys Gly Ala Thr Thr Gly Gly Gly Gly Ala Thr
 115 120 125

Thr Gly Cys Thr Ala Thr Cys Thr Gly Thr Ala Cys Cys Gly Thr Thr
 130 135 140

Gly Ala Cys Gly Gly Ala Cys Ala Gly Cys Thr Thr Thr Thr Thr Cys
 145 150 155 160

Ala Gly Gly Cys Cys Gly Gly Ala Gly Ala Cys Gly Cys Gly Cys Ala
 165 170 175

Ala Gly Ala Ala Cys Gly Thr Thr Thr Thr Thr Cys Cys Ala Thr Thr
 180 185 190

Cys Ala Gly Thr Cys Thr Ala Thr Thr Thr Cys Cys Ala Ala Ala Gly
 195 200 205

Thr Gly Cys Thr Gly Ala Gly Thr Cys Thr Cys Gly Thr Thr Gly Thr
 210 215 220

Cys Gly Cys Cys Ala Thr Gly Cys Gly Thr Cys Ala Thr Thr Ala Cys
 225 230 235 240

Thr Cys Cys Gly Ala Ala Gly Ala Gly Gly Ala Ala Ala Thr Cys Thr
 245 250 255

Gly Gly Cys Ala Ala Cys Gly Cys Gly Thr Cys Gly Gly Cys Ala Ala
 260 265 270

Ala Gly Ala Thr Cys Cys Gly Thr Cys Thr Gly Gly Ala Thr Cys Ala
 275 280 285

Cys Cys Gly Thr Thr Cys Ala Ala Thr Thr Cys Cys Thr Thr Ala Gly
 290 295 300

Thr Gly Cys Ala Ala Cys Thr Gly Gly Ala Ala Ala Thr Gly Gly Ala
 305 310 315 320

Gly Cys Ala Gly Gly Gly Thr Ala Thr Ala Cys Cys Gly Cys Gly Thr
 325 330 335

Ala Ala Thr Cys Cys Gly Thr Thr Cys Ala Thr Thr Ala Ala Thr Gly
 340 345 350

Cys Cys Gly Gly Thr Gly Cys Gly Cys Thr Gly Gly Thr Gly Gly Thr
 355 360 365

Cys Thr Gly Cys Gly Ala Thr Ala Thr Gly Thr Thr Gly Cys Ala Ala
 370 375 380

Gly Gly Gly Cys Gly Ala Thr Thr Ala Ala Gly Cys Gly Cys Ala Cys
 385 390 395 400

Cys Ala Cys Gly Gly Cys Ala Ala Cys Gly Thr Ala Thr Gly Cys Thr
 405 410 415

Gly Gly Ala Ala Gly Thr Cys Gly Thr Gly Cys Gly Cys Gly Gly Cys
 420 425 430

Thr Thr Ala Ala Gly Cys Gly Gly Thr Gly Thr Gly Thr Cys Thr Gly
 435 440 445

Ala Thr Ala Thr Thr Thr Cys Cys Thr Ala Cys Gly Ala Thr Ala Cys
 450 455 460

Gly Gly Thr Gly Gly Thr Ala Gly Cys Gly Cys Gly Thr Thr Cys Cys
 465 470 475 480

Gly Ala Ala Thr Thr Thr Gly Ala Ala Cys Ala Thr Thr Cys Cys Gly
 485 490 495

Cys Gly Cys Gly Ala Ala Ala Thr Gly Cys Gly Gly Cys Thr Ala Thr
 500 505 510

Cys Gly Cys Cys Thr Gly Gly Cys Thr Gly Ala Thr Gly Ala Ala Gly
 515 520 525

Thr	Cys	Gly	Thr	Thr	Thr	Gly	Gly	Cys	Ala	Ala	Thr	Thr	Thr	Cys	Cys	
530						535					540					
Ala	Thr	Cys	Ala	Thr	Gly	Ala	Cys	Gly	Thr	Gly	Ala	Cys	Ala	Ala	Cys	
545					550					555					560	
Cys	Gly	Thr	Thr	Cys	Thr	Gly	Cys	Ala	Ala	Ala	Ala	Cys	Thr	Ala	Cys	
				565					570					575		
Thr	Thr	Thr	Cys	Ala	Thr	Thr	Ala	Cys	Thr	Gly	Cys	Gly	Cys	Thr	Cys	
			580					585						590		
Thr	Gly	Ala	Ala	Ala	Ala	Thr	Gly	Ala	Gly	Cys	Thr	Gly	Thr	Gly	Thr	
		595					600					605				
Ala	Gly	Ala	Gly	Cys	Thr	Gly	Gly	Cys	Cys	Cys	Gly	Gly	Ala	Cys	Gly	
	610					615					620					
Thr	Thr	Thr	Gly	Thr	Cys	Thr	Thr	Thr	Cys	Thr	Gly	Gly	Cys	Thr	Ala	
625					630					635					640	
Ala	Thr	Cys	Ala	Gly	Gly	Gly	Gly	Ala	Ala	Ala	Gly	Cys	Thr	Ala	Thr	
				645					650					655		
Thr	Cys	Ala	Thr	Ala	Thr	Thr	Gly	Ala	Thr	Gly	Ala	Ala	Cys	Cys	Ala	
			660					665					670			
Gly	Thr	Gly	Gly	Thr	Gly	Ala	Cys	Gly	Cys	Cys	Ala	Ala	Thr	Gly	Cys	
		675					680					685				
Ala	Gly	Gly	Cys	Gly	Cys	Gly	Gly	Cys	Ala	Ala	Ala	Thr	Thr	Ala	Ala	
	690					695					700					
Cys	Gly	Cys	Gly	Cys	Thr	Gly	Ala	Thr	Gly	Gly	Cys	Gly	Ala	Cys	Cys	
705					710					715					720	
Ala	Gly	Thr	Gly	Gly	Thr	Ala	Thr	Gly	Thr	Ala	Cys	Cys	Ala	Gly	Ala	
				725					730					735		
Ala	Cys	Gly	Cys	Gly	Gly	Gly	Gly	Gly	Ala	Gly	Thr	Thr	Thr	Gly	Cys	
			740					745					750			
Cys	Thr	Gly	Gly	Cys	Gly	Gly	Gly	Thr	Gly	Gly	Gly	Gly	Cys	Thr	Ala	
		755					760					765				
Cys	Cys	Gly	Gly	Cys	Gly	Ala	Ala	Ala	Thr	Cys	Thr	Gly	Gly	Cys	Gly	
	770					775					780					

Thr Thr Gly Gly Thr Gly Gly Cys Gly Gly Thr Ala Thr Thr Gly Thr
785 790 795 800

Gly Gly Cys Gly Ala Thr Thr Gly Thr Thr Cys Cys Gly Cys Ala Thr
805 810 815

Gly Ala Ala Ala Thr Gly Gly Cys Cys Ala Thr Cys Gly Cys Thr Gly
820 825 830

Thr Cys Thr Gly Gly Ala Gly Thr Cys Cys Gly Gly Ala Ala Cys Thr
835 840 845

Gly Gly Ala Thr Gly Ala Thr Gly Cys Ala Gly Gly Thr Ala Ala Cys
850 855 860

Thr Cys Gly Cys Thr Thr Gly Cys Gly Gly Gly Thr Ala Thr Thr Gly
865 870 875 880

Cys Cys Gly Thr Thr Cys Thr Thr Gly Ala Ala Cys Ala Ala Thr Thr
885 890 895

Gly Ala Cys Gly Ala Ala Ala Cys Ala Gly Thr Thr Ala Gly Gly Gly
900 905 910

Cys Gly Thr Thr Cys Gly Gly Thr Thr Thr Ala Thr Thr Ala Ala
915 920 925

<210> 90
<211> 1344
<212> DNA
<213> Escherichia coli

<400> 90
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caaaccgagt tcgcgcaagc cgttcgtgaa gtaatgacca cactctggcc ttttcttgaa 120
caaaatccaa aatatcgcca gatgtcatta ctggagcgtc tggttgaacc ggagcgcgtg 180
atccagtttc gcgtggtatg ggttgatgat cgcaaccaga tacagggtcaa ccgtgcatgg 240
cgtgtgcagt tcagctctgc catcggcccg tacaaaggcg gtatgcgctt ccatccgtca 300
gttaaccttt ccattctcaa attcctcggc tttgaacaaa ccttcaaaaa tgccctgact 360
actctgccga tgggcggtgg taaaggcggc agcgatttcg atccgaaagg aaaaagcgaa 420
ggtgaagtga tgcgtttttg ccaggcgctg atgactgaac tgtatcgcca cctgggcgcg 480
gataccgacg ttccggcagg tgatatcggg gttggtggtc gtgaagtcgg ctttatggcg 540
gggatgatga aaaagctctc caacaatacc gcctgcgtct tcaccggtaa gggcctttca 600
tttggcggca gtcttattcg cccggaagct accggctacg gtctggttta tttcacagaa 660

gcaatgctaa aacgccacgg tatgggtttt gaagggatgc gcgtttccgt ttctggctcc 720
ggcaacgtcg ccagtagcgc tatcgaaaaa gcgatggaat ttggtgctcg tgtgatcaact 780
gcgtcagact ccagcggcac tgtagtgtgat gaaagcggat tcacgaaaga gaaactggca 840
cgtcttatcg aaatcaaagc cagccgcgat ggtcgagtgg cagattacgc caaagaattt 900
gggtctggtct atctcgaagg ccaacagccg tgggtctctac cggttgatat cgccctgcct 960
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caggcaggcg tactatattgc accgggtaaa gcggctaata ctggtggcgt cgctacatcg 1140
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cgtttgcatc acatcatgct ggatatccac catgcctgtg ttgagcatgg tggatgaagg 1260
gagcaaacca actacgtgca gggcgcgaac attgccgggt ttgtgaagg tgcgatgcg 1320
atgctggcgc aggtgtgat ttaa 1344

<210> 91
<211> 447
<212> PRT
<213> Escherichia coli

<400> 91

Met Asp Gln Thr Tyr Ser Leu Glu Ser Phe Leu Asn His Val Gln Lys
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Arg Asp Pro Asn Gln Thr Glu Phe Ala Gln Ala Val Arg Glu Val Met
20 25 30

Thr Thr Leu Trp Pro Phe Leu Glu Gln Asn Pro Lys Tyr Arg Gln Met
35 40 45

Ser Leu Leu Glu Arg Leu Val Glu Pro Glu Arg Val Ile Gln Phe Arg
50 55 60

Val Val Trp Val Asp Asp Arg Asn Gln Ile Gln Val Asn Arg Ala Trp
65 70 75 80

Arg Val Gln Phe Ser Ser Ala Ile Gly Pro Tyr Lys Gly Gly Met Arg
85 90 95

Phe His Pro Ser Val Asn Leu Ser Ile Leu Lys Phe Leu Gly Phe Glu
100 105 110

Gln Thr Phe Lys Asn Ala Leu Thr Thr Leu Pro Met Gly Gly Gly Lys
115 120 125

Gly	Gly	Ser	Asp	Phe	Asp	Pro	Lys	Gly	Lys	Ser	Glu	Gly	Glu	Val	Met	130	135	140
Arg	Phe	Cys	Gln	Ala	Leu	Met	Thr	Glu	Leu	Tyr	Arg	His	Leu	Gly	Ala	145	150	155
Asp	Thr	Asp	Val	Pro	Ala	Gly	Asp	Ile	Gly	Val	Gly	Gly	Arg	Glu	Val	165	170	175
Gly	Phe	Met	Ala	Gly	Met	Met	Lys	Lys	Leu	Ser	Asn	Asn	Thr	Ala	Cys	180	185	190
Val	Phe	Thr	Gly	Lys	Gly	Leu	Ser	Phe	Gly	Gly	Ser	Leu	Ile	Arg	Pro	195	200	205
Glu	Ala	Thr	Gly	Tyr	Gly	Leu	Val	Tyr	Phe	Thr	Glu	Ala	Met	Leu	Lys	210	215	220
Arg	His	Gly	Met	Gly	Phe	Glu	Gly	Met	Arg	Val	Ser	Val	Ser	Gly	Ser	225	230	235
Gly	Asn	Val	Ala	Gln	Tyr	Ala	Ile	Glu	Lys	Ala	Met	Glu	Phe	Gly	Ala	245	250	255
Arg	Val	Ile	Thr	Ala	Ser	Asp	Ser	Ser	Gly	Thr	Val	Val	Asp	Glu	Ser	260	265	270
Gly	Phe	Thr	Lys	Glu	Lys	Leu	Ala	Arg	Leu	Ile	Glu	Ile	Lys	Ala	Ser	275	280	285
Arg	Asp	Gly	Arg	Val	Ala	Asp	Tyr	Ala	Lys	Glu	Phe	Gly	Leu	Val	Tyr	290	295	300
Leu	Glu	Gly	Gln	Gln	Pro	Trp	Ser	Leu	Pro	Val	Asp	Ile	Ala	Leu	Pro	305	310	315
Cys	Ala	Thr	Gln	Asn	Glu	Leu	Asp	Val	Asp	Ala	Ala	His	Gln	Leu	Ile	325	330	335
Ala	Asn	Gly	Val	Lys	Ala	Val	Ala	Glu	Gly	Ala	Asn	Met	Pro	Thr	Thr	340	345	350
Ile	Glu	Ala	Thr	Glu	Leu	Phe	Gln	Gln	Ala	Gly	Val	Leu	Phe	Ala	Pro	355	360	365
Gly	Lys	Ala	Ala	Asn	Ala	Gly	Gly	Val	Ala	Thr	Ser	Gly	Leu	Glu	Met	370	375	380

Ala Gln Asn Ala Ala Arg Leu Gly Trp Lys Ala Glu Lys Val Asp Ala
 385 390 395 400

Arg Leu His His Ile Met Leu Asp Ile His His Ala Cys Val Glu His
 405 410 415

Gly Gly Glu Gly Glu Gln Thr Asn Tyr Val Gln Gly Ala Asn Ile Ala
 420 425 430

Gly Phe Val Lys Val Ala Asp Ala Met Leu Ala Gln Gly Val Ile
 435 440 445

<210> 92
 <211> 1479
 <212> DNA
 <213> Escherichia coli

<400> 92
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 ttccgcctgc ttaccgtgtc gctgggtgatt atcgcgctgg cagatacgtc ttctgacttc 180
 ggtatcgcta actcgattat tcagcgaaaa gaaatcagtc accttgaact caccacgttg 240
 tactggctga acgtcgggct ggggatcgtg gtgtgcgtgg cgggtgttttt gttgagtgat 300
 ctcatcggcg acgtgctgaa taaccgcggc ctggcaccgt tgattaaaaac attatcgctg 360
 gcgtttgtgg taatcccccga cgggcaacag ttccgcgcgt tgatgcaaaa agagctggag 420
 ttcaacaaaa tcggcatgat cgaaaccagc gcggtgctgg cgggcttcac ttgtacggtg 480
 gtttagcgccc atttctggcc gctggcgatg accgcgatcc tcggttatct ggtcaatagt 540
 gcggtgagaa cgctgctggt tggctacttt ggccgcaaaa tttatcgccc cggctctgcat 600
 ttctcgctgg cgtcgggtggc accgaactta cgctttggtg cctggctgac ggcggacagc 660
 atcatcaact atctcaatac caacccttca acgctcgtgc tggcgcgtat tctcggcgcg 720
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 aacccaatca tcaccgcgtg gttgtttccg gcattcgcca aaattcagga cgataccgaa 840
 aagctgcgtg ttaacttcta caagctgctg tcggtagtgg ggattatcaa ctttccggcg 900
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 gtggtgatga ttgtgctgtc gcgccatccg ctggtgggtg aagtgaagcg tcagttttgt 1440
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<210> 93
 <211> 492
 <212> PRT
 <213> Escherichia coli
 <400> 93

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

Ala Thr Val Ile Ile Ile Gly Leu Gly Leu Val Gln Met Thr Val Leu
 20 25 30

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

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

Ser Ile Ile Gln Arg Lys Glu Ile Ser His Leu Glu Leu Thr Thr Leu
 65 70 75 80

Tyr Trp Leu Asn Val Gly Leu Gly Ile Val Val Cys Val Ala Val Phe
 85 90 95

Leu Leu Ser Asp Leu Ile Gly Asp Val Leu Asn Asn Pro Asp Leu Ala
 100 105 110

Pro Leu Ile Lys Thr Leu Ser Leu Ala Phe Val Val Ile Pro His Gly
 115 120 125

Gln Gln Phe Arg Ala Leu Met Gln Lys Glu Leu Glu Phe Asn Lys Ile
 130 135 140

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

Val Ser Ala His Phe Trp Pro Leu Ala Met Thr Ala Ile Leu Gly Tyr
 165 170 175

Leu Val Asn Ser Ala Val Arg Thr Leu Leu Phe Gly Tyr Phe Gly Arg
 180 185 190

Lys Ile Tyr Arg Pro Gly Leu His Phe Ser Leu Ala Ser Val Ala Pro
 195 200 205

Asn Leu Arg Phe Gly Ala Trp Leu Thr Ala Asp Ser Ile Ile Asn Tyr
 210 215 220

Leu Asn Thr Asn Leu Ser Thr Leu Val Leu Ala Arg Ile Leu Gly Ala
 225 230 235 240

Gly Val Ala Gly Gly Tyr Asn Leu Ala Tyr Asn Val Ala Val Val Pro
 245 250 255

Pro Met Lys Leu Asn Pro Ile Ile Thr Arg Val Leu Phe Pro Ala Phe
 260 265 270

Ala Lys Ile Gln Asp Asp Thr Glu Lys Leu Arg Val Asn Phe Tyr Lys
 275 280 285

Leu Leu Ser Val Val Gly Ile Ile Asn Phe Pro Ala Leu Leu Gly Leu
 290 295 300

Met Val Val Ser Asn Asn Phe Val Pro Leu Val Phe Gly Glu Lys Trp
 305 310 315 320

Asn Ser Ile Ile Pro Val Leu Gln Leu Leu Cys Val Val Gly Leu Leu
 325 330 335

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

Val Asp Ile Ser Phe Lys Phe Asn Val Phe Lys Thr Phe Leu Phe Ile
 355 360 365

Pro Ala Ile Val Ile Gly Gly Gln Met Ala Gly Ala Ile Gly Val Thr
 370 375 380

Leu Gly Phe Leu Leu Val Gln Ile Ile Asn Thr Ile Leu Ser Tyr Phe
 385 390 395 400

Val Met Ile Lys Pro Val Leu Gly Ser Ser Tyr Arg Gln Tyr Ile Leu
 405 410 415

Ser Leu Trp Leu Pro Phe Tyr Leu Ser Leu Pro Thr Leu Val Val Ser
 420 425 430

Tyr Ala Leu Gly Ile Val Leu Lys Gly Gln Leu Ala Leu Gly Met Leu
 435 440 445

Leu Ala Val Gln Ile Ala Thr Gly Val Leu Ala Phe Val Val Met Ile
 450 455 460

Val Leu Ser Arg His Pro Leu Val Val Glu Val Lys Arg Gln Phe Cys
 465 470 475 480

Arg Ser Glu Lys Met Lys Met Leu Leu Arg Ala Gly
 485 490

<210> 94
 <211> 1395
 <212> DNA
 <213> Escherichia coli

<400> 94
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 ggactgtcat tcctctacat gcacctgttg gtggcgctga ttacgctggt ggtgttccag 180
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 tttgccctgt tgctacaaaa ctggacctta agcgtgattt tcagcgccgg actggtggcg 300
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 atcggactgg tggtttgccg ttcgtgtatt cgcattgggg cgggctggct gcgtaatcat 420
 ggctataaca agcgcatggt cgcggtggcg ggggatttag ccgccgggca aatgctgatg 480
 gagagcttcc gtaaccagcc gtggttaggg tttgaagtgg tgggcgttta ccacgaccgc 540
 aaaccgggcg gcgtttctaa cgactgggcg ggtaacctgc aacagctggt cgaggacgcg 600
 aaagcgggca agattcataa cgtctatatc gcgatgcaa tgtgcgacgg cgcgcgagtg 660
 aaaaaactgg tccatcaact ggcggacacc acctgttcgg tgctgctgat ccccgacgtc 720
 ttaccttca acattctcca ttcacgcctc gaagagatga acggcgtacc ggtggtgccg 780
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 ctggcgacgc ttattctgct gctgatctcc ccggtgctgt gctgtattgc gctggcggtg 900
 aaactcagtt caccagggcc gggtattttc cgccagactc gctacggcat ggatggcaag 960
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 caggcgacgc agaacgatcc gcgcgtcacc aaagtgggga actttctgcg ccgtacctcg 1080
 ctggatgaat tgccgcagtt tatcaatgtg ctgaccgggg ggatgtcgat tgtcgggtcca 1140
 cgtccgcacg cagtagcgca taacgaacag tatcgacagc tcattgaagg ctacatgctg 1200
 cgccataagg tgaaaccggg cattaccggc tgggcgcaga ttaacggctg gcgcggcgaa 1260
 accgacacgc tggagaaaaat ggaaaaacgc gtcgagttcg accttgagta catccgcgaa 1320
 tggagcgtct ggttcgatat caaaatcggt ttcctgacgg tgttcaaagg tttcgttaac 1380

<210> 95

<211> 464

<212> PRT

<213> Escherichia coli

<400> 95

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

Leu Trp Leu Val Cys Glu Val Ser Gly Leu Ser Phe Leu Tyr Met His
35 40 45

Leu Leu Val Ala Leu Ile Thr Leu Val Val Phe Gln Met Leu Gly Gly
50 55 60

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

Phe Ala Leu Leu Leu Gln Asn Trp Thr Leu Ser Val Ile Phe Ser Ala
85 90 95

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

Leu Ala Trp Tyr Ala Leu Thr Ser Ile Gly Leu Val Val Cys Arg Ser
115 120 125

Cys Ile Arg Ile Gly Ala Gly Trp Leu Arg Asn His Gly Tyr Asn Lys
130 135 140

Arg Met Val Ala Val Ala Gly Asp Leu Ala Ala Gly Gln Met Leu Met
145 150 155 160

Glu Ser Phe Arg Asn Gln Pro Trp Leu Gly Phe Glu Val Val Gly Val
165 170 175

Tyr His Asp Pro Lys Pro Gly Gly Val Ser Asn Asp Trp Ala Gly Asn
180 185 190

Leu Gln Gln Leu Val Glu Asp Ala Lys Ala Gly Lys Ile His Asn Val
195 200 205

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

210

215

220

His Gln Leu Ala Asp Thr Thr Cys Ser Val Leu Leu Ile Pro Asp Val
 225 230 235 240

Phe Thr Phe Asn Ile Leu His Ser Arg Leu Glu Glu Met Asn Gly Val
 245 250 255

Pro Val Val Pro Leu Tyr Asp Thr Pro Leu Ser Gly Val Asn Arg Leu
 260 265 270

Leu Lys Arg Ala Glu Asp Ile Val Leu Ala Thr Leu Ile Leu Leu Leu
 275 280 285

Ile Ser Pro Val Leu Cys Cys Ile Ala Leu Ala Val Lys Leu Ser Ser
 290 295 300

Pro Gly Pro Val Ile Phe Arg Gln Thr Arg Tyr Gly Met Asp Gly Lys
 305 310 315 320

Pro Ile Lys Val Trp Lys Phe Arg Ser Met Lys Val Met Glu Asn Asp
 325 330 335

Lys Val Val Thr Gln Ala Thr Gln Asn Asp Pro Arg Val Thr Lys Val
 340 345 350

Gly Asn Phe Leu Arg Arg Thr Ser Leu Asp Glu Leu Pro Gln Phe Ile
 355 360 365

Asn Val Leu Thr Gly Gly Met Ser Ile Val Gly Pro Arg Pro His Ala
 370 375 380

Val Ala His Asn Glu Gln Tyr Arg Gln Leu Ile Glu Gly Tyr Met Leu
 385 390 395 400

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

Trp Arg Gly Glu Thr Asp Thr Leu Glu Lys Met Glu Lys Arg Val Glu
 420 425 430

Phe Asp Leu Glu Tyr Ile Arg Glu Trp Ser Val Trp Phe Asp Ile Lys
 435 440 445

Ile Val Phe Leu Thr Val Phe Lys Gly Phe Val Asn Lys Ala Ala Tyr
 450 455 460

<211> 1119
<212> DNA
<213> Escherichia coli

<400> 96
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gcccgtgaat tgcagtgtat caatatgtca agcttggatg ctttagtctc aagtaaatta 180
gtcgattgcg tgatcgtagc caccocaaat tatctgcata aagaaccagt aattaaagca 240
gcaaagaata agaagcatgt tttttgtgaa aaaccaattg cattaagtta tgaagattgt 300
gtggatatgg tcaaagcgtg taaagaagct ggtgtgacct ttatggccgg gcatattatg 360
aattttttca atggggttca atatgcacgg aagttaatta aagaagggtgt tatcggcgaa 420
atattatcat gtcatactaa gagaaatggc tgggaaaaca aacaagagag actttcctg 480
aaaaagatga aagaacaatc tgggtggacat ctatatcatc atatacatga gttagattgt 540
gttcagcatt tacttggaga aataccagag acggttacta tgattgggtg aaatttggcc 600
cattctggtc caggatttgg caatgaagat gatatgttat ttatgacctt ggaattcccg 660
tcaggaaaac tagcaacctt agagtggggg agtgcattta actggccgga acattatgtc 720
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aaaatcagtg agatcattaa acatacatca gtaatgtaa 1119

<210> 97
<211> 372
<212> PRT
<213> Escherichia coli

<400> 97
Met Ile Asn Tyr Gly Val Val Gly Val Gly Tyr Phe Gly Ala Glu Leu
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Ala Arg Phe Met Asn Met His Asp Asn Ala Lys Ile Thr Cys Val Tyr
20 25 30
Asp Pro Glu Asn Gly Glu Asn Ile Ala Arg Glu Leu Gln Cys Ile Asn
35 40 45
Met Ser Ser Leu Asp Ala Leu Val Ser Ser Lys Leu Val Asp Cys Val

50

55

60

Ile Val Ala Thr Pro Asn Tyr Leu His Lys Glu Pro Val Ile Lys Ala
65 70 75 80

Ala Lys Asn Lys Lys His Val Phe Cys Glu Lys Pro Ile Ala Leu Ser
85 90 95

Tyr Glu Asp Cys Val Asp Met Val Lys Ala Cys Lys Glu Ala Gly Val
100 105 110

Thr Phe Met Ala Gly His Ile Met Asn Phe Phe Asn Gly Val Gln Tyr
115 120 125

Ala Arg Lys Leu Ile Lys Glu Gly Val Ile Gly Glu Ile Leu Ser Cys
130 135 140

His Thr Lys Arg Asn Gly Trp Glu Asn Lys Gln Glu Arg Leu Ser Trp
145 150 155 160

Lys Lys Met Lys Glu Gln Ser Gly Gly His Leu Tyr His His Ile His
165 170 175

Glu Leu Asp Cys Val Gln His Leu Leu Gly Glu Ile Pro Glu Thr Val
180 185 190

Thr Met Ile Gly Gly Asn Leu Ala His Ser Gly Pro Gly Phe Gly Asn
195 200 205

Glu Asp Asp Met Leu Phe Met Thr Leu Glu Phe Pro Ser Gly Lys Leu
210 215 220

Ala Thr Leu Glu Trp Gly Ser Ala Phe Asn Trp Pro Glu His Tyr Val
225 230 235 240

Ile Ile Asn Gly Thr Lys Gly Ser Ile Lys Ile Asp Met Gln Glu Thr
245 250 255

Ala Gly Ser Leu Arg Ile Gly Gly Gln Thr Lys His Phe Leu Val His
260 265 270

Glu Thr Gln Glu Glu Asp Asp Asp Arg Arg Lys Gly Asn Met Thr Ser
275 280 285

Glu Met Asp Gly Ala Ile Ala Tyr Gly His Pro Gly Lys Lys Thr Pro
290 295 300

Leu Trp Leu Ala Ser Leu Ile Arg Lys Glu Thr Leu Phe Leu His Asn

305		310		315		320
Ile Leu Cys Gly	Ala Lys Pro Glu Glu Asp Tyr	Ile Asp Leu Leu Asn				
	325		330		335	
Gly Glu Ala Ala Met Ser Ala Ile Ala Thr Ala Asp Ala Ala Thr Leu						
	340		345		350	
Ser Arg Ser Gln Asp Arg Lys Val Lys Ile Ser Glu Ile Ile Lys His						
	355		360		365	
Thr Ser Val Met						
	370					

<210> 98
 <211> 1776
 <212> DNA
 <213> Escherichia coli

<400> 98	
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ctgaccgaga aactgcgcca tgccctgcgga gctgccgtcg agtgtgtcat ttccgatacc	180
tgtatcgcggt gtatggctga agccgctgct tgccaagaaa aattcagcag tcagaatgta	240
ggcctcacca ttacggtaac gccttgctgg tgctatggca gtgaaacctat cgacatggat	300
ccaacccgcc cgaaggccat ttggggcttt aacggcactg aacgccccgg cgctgtttac	360
ctggcagcgg ctctggcagc tcacagccag aaaggcatcc cagcattctc catttacggt	420
catgacgttc aggatgccga tgacacatcg attcctgccg atgttgaaga aaaactgctg	480
cgttttgccc gcgccggttt ggccgtcgcc agcatgaaag gtaaaagcta tctgtcgtcg	540
ggcggcggttt cgatgggtat cgccgggtcc attgttgatc acaacttctt tgaatcctgg	600
ctgggaatga aagtccaggc ggtggatatg accgaactgc gtcgccgtat cgatcagaag	660
atttacgacg aagccgaatt ggaaatggca ctggcctggg ctgataaaaa cttccgctat	720
ggcgaagatg aaaataacaa acagtatcaa cgtaatgccg agcaaagccg cgcagttctg	780
cgcgaaagtt tactgatggc gatgtgtatc cgcgacatga tgcaaggcaa cagcaaactg	840
gccgatattg gtcgcgtgga agaatacactt ggctacaacg ccatcgctgc gggcttccag	900
gggcaacgct actggaccga tcaatatccc aatggtgaca ccgccgaagc gatcctcaac	960
agttcatattg actggaatgg cgtgcgcgaa ccctttgtcg tggcgaccga aaacgacagt	1020
cttaacggcg tggcaatgct aatgggtcac cagctcaccg gcaccgctca ggtatttgcc	1080
gatgtgcgta cctactggtc accagaagca attgagcgtg taacgggggca taaactggat	1140
ggactggcag aacacggcat catccatttg atcaactccg gttctgctgc gctggacggt	1200

tcctgtaa	aacgcgacag	cgaaggtaac	ccgacgatga	agccacactg	ggaaatctct	1260
cagcaagagg	ctgacgcttg	cctcgccgct	accgaatggg	gcccggcgat	ccacgaatac	1320
ttccgtggcg	gcggttactc	ttcccgcctc	cttaccgaag	gcggcgctccc	gttcaccatg	1380
actcgtgtca	acatcatcaa	aggcctggga	ccggtactgc	aaatcgcgga	aggctggagc	1440
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accacctggg	ttgcaccgcg	cctcaccggg	aaagggccgt	ttacggatgt	gtactcggta	1560
atggcgaaact	ggggcgctaa	ccatgggggt	ctgaccatcg	gccacgttgg	cgcagacttt	1620
atcactctcg	cctccatgct	gcgtatccc	gtatgtatgc	acaacgttga	agagaccaaa	1680
gtgtatcgtc	cttctgcctg	ggctgcgcac	ggcatggata	ttgaaggcca	ggattaccgc	1740
gcttgccaga	actacggtcc	gttgtacaag	cgtaa			1776

<210> 99
 <211> 591
 <212> PRT
 <213> Escherichia coli

<400> 99

Met	Lys	Lys	Ile	Ser	Leu	Pro	Lys	Ile	Gly	Ile	Arg	Pro	Val	Ile	Asp
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Gly	Arg	Arg	Met	Gly	Val	Arg	Glu	Ser	Leu	Glu	Glu	Gln	Thr	Met	Asn
			20					25					30		

Met	Ala	Lys	Ala	Thr	Ala	Ala	Leu	Leu	Thr	Glu	Lys	Leu	Arg	His	Ala
		35					40					45			

Cys	Gly	Ala	Ala	Val	Glu	Cys	Val	Ile	Ser	Asp	Thr	Cys	Ile	Ala	Gly
	50					55					60				

Met	Ala	Glu	Ala	Ala	Ala	Cys	Glu	Glu	Lys	Phe	Ser	Ser	Gln	Asn	Val
65					70					75					80

Gly	Leu	Thr	Ile	Thr	Val	Thr	Pro	Cys	Trp	Cys	Tyr	Gly	Ser	Glu	Thr
			85						90					95	

Ile	Asp	Met	Asp	Pro	Thr	Arg	Pro	Lys	Ala	Ile	Trp	Gly	Phe	Asn	Gly
			100					105					110		

Thr	Glu	Arg	Pro	Gly	Ala	Val	Tyr	Leu	Ala	Ala	Ala	Leu	Ala	Ala	His
		115					120					125			

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

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

Ser Cys Lys Gln Arg Asp Ser Glu Gly Asn Pro Thr Met Lys Pro His
405 410 415

Trp Glu Ile Ser Gln Gln Glu Ala Asp Ala Cys Leu Ala Ala Thr Glu
420 425 430

Trp Cys Pro Ala Ile His Glu Tyr Phe Arg Gly Gly Gly Tyr Ser Ser
435 440 445

Arg Phe Leu Thr Glu Gly Gly Val Pro Phe Thr Met Thr Arg Val Asn
450 455 460

Ile Ile Lys Gly Leu Gly Pro Val Leu Gln Ile Ala Glu Gly Trp Ser
465 470 475 480

Val Glu Leu Pro Lys Asp Val His Asp Ile Leu Asn Lys Arg Thr Asn
485 490 495

Ser Thr Trp Pro Thr Thr Trp Phe Ala Pro Arg Leu Thr Gly Lys Gly
500 505 510

Pro Phe Thr Asp Val Tyr Ser Val Met Ala Asn Trp Gly Ala Asn His
515 520 525

Gly Val Leu Thr Ile Gly His Val Gly Ala Asp Phe Ile Thr Leu Ala
530 535 540

Ser Met Leu Arg Ile Pro Val Cys Met His Asn Val Glu Glu Thr Lys
545 550 555 560

Val Tyr Arg Pro Ser Ala Trp Ala Ala His Gly Met Asp Ile Glu Gly
565 570 575

Gln Asp Tyr Arg Ala Cys Gln Asn Tyr Gly Pro Leu Tyr Lys Arg
580 585 590

<210> 100

<211> 1419

<212> DNA

<213> Escherichia coli

<400> 100

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gttaatcggc agggcaaaat tgttgcccgc gcctcaacgc ctaatgccag cgatatcgcg 120

atggaaaaca acacctggca ccagtgggtct ttagacgcca ttttgcaacg ctttgctgat 180

tgctgtcggc aaatcaatag tgaactgact gaatgccaca tccgcggtat cgccgtcacc 240

acctttggtg tggatggcgc tctggtagat aagcaaggca atctgctcta tccgattatt 300

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agctggaaat gtccgcgaac agcagcgggt atggacaata ttgaacgggt aatctccgca      360
cagcgggtgc aggctatttc tggcgctcga gccttttagtt tcaatacgtt atataagttg      420
gtgtgggtga aagaaaatca tccacaactg ctggaacgcg cgcacgcctg gctcttttatt      480
tcgtcgctga ttaaccaccg ttttaaccggc gaattcacta ctgatatcac gatggccgga      540
accagccaga tgctggatat ccagcaacgc gatttcagtc cgcaaatttt acaagccacc      600
gggtattccac gccgactctt ccctcgtctg gtggaagcgg gtgaacagat tggtagccta      660
cagaacagcg ccgcagcaat gctcggctta cccgttggca taccggtgat ttccgcaggt      720
cacgataccc agttcgccct ttttggcgct ggtgctgaac aaaatgaacc cgtgctctct      780
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cagtacgccg gttccacctg cgaactggat agccaggcag ggttgataaa cccaggtatg      900
caatggctgg catccggcgt gctggaatgg gtgagaaaac tgttctggac ggctgaaaca      960
ccctggcaaa tgttgattga agaagctcgt ctgatcgcgc ctggcgcgga tggcgtaaaa     1020
atgcagtgtg atttattgtc gtgtcagaac gctggctggc aaggagtgc gcttaatacc     1080
acgcgggggc atttctatcg cgcggcgctg gaaggggtta ctgcgcaatt acagcgcaat     1140
ctacagatgc tggaaaaaat cgggcacttt aaggcctctg aattattgtt agtcgggtga     1200
ggaagtcgca acacattgtg gaatcagatt aaagccaata tgcttgatat tccggtaaaa     1260
gttctcgacg acgccgaaac gaccgtcgca ggagctgcgc tgttcggttg gtatggcgta     1320
ggggaattta acagcccgga agaagccgc gcacagattc attatcagta ccgttatttc     1380
taccgcgcaa ctgaacctga atttatagag gaagtgtga                               1419

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<210> 101
<211> 472
<212> PRT
<213> Escherichia coli

<400> 101

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

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```

Arg Ala Ile Ala Val Asn Arg Gln Gly Lys Ile Val Ala Arg Ala Ser
          20           25           30

```

```

Thr Pro Asn Ala Ser Asp Ile Ala Met Glu Asn Asn Thr Trp His Gln
          35           40           45

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```

Trp Ser Leu Asp Ala Ile Leu Gln Arg Phe Ala Asp Cys Cys Arg Gln
50           55           60

```

```

Ile Asn Ser Glu Leu Thr Glu Cys His Ile Arg Gly Ile Ala Val Thr

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

325

330

335

Asp Gly Val Lys Met Gln Cys Asp Leu Leu Ser Cys Gln Asn Ala Gly
 340 345 350

Trp Gln Gly Val Thr Leu Asn Thr Thr Arg Gly His Phe Tyr Arg Ala
 355 360 365

Ala Leu Glu Gly Leu Thr Ala Gln Leu Gln Arg Asn Leu Gln Met Leu
 370 375 380

Glu Lys Ile Gly His Phe Lys Ala Ser Glu Leu Leu Leu Val Gly Gly
 385 390 395 400

Gly Ser Arg Asn Thr Leu Trp Asn Gln Ile Lys Ala Asn Met Leu Asp
 405 410 415

Ile Pro Val Lys Val Leu Asp Asp Ala Glu Thr Thr Val Ala Gly Ala
 420 425 430

Ala Leu Phe Gly Trp Tyr Gly Val Gly Glu Phe Asn Ser Pro Glu Glu
 435 440 445

Ala Arg Ala Gln Ile His Tyr Gln Tyr Arg Tyr Phe Tyr Pro Gln Thr
 450 455 460

Glu Pro Glu Phe Ile Glu Glu Val
 465 470

<210> 102

<211> 492

<212> DNA

<213> Escherichia coli

<400> 102

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gcggcaatgt cgctgtgttg ttgctgtgcg aaagagagaa tcgtactgat caccgacgcg 180

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cgtcgctgca tccggcgcga atgctgggtg ttgatgggtg tctgggatcg cttaaaccgg 420

gcaaacgcgc cagagtcggt gcgctggata gcgggctaca tgtgcaacaa atctggattc 480

agggtcaatt ag 492

<210> 103
<211> 167
<212> PRT
<213> Escherichia coli

<400> 103

Met His Cys Tyr Asn Gly Met Thr Gly Leu His His Arg Glu Pro Gly
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Met Val Gly Ala Gly Leu Thr Asp Lys Arg Ala Trp Leu Glu Leu Ile
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Ala Asp Gly His His Val His Pro Ala Ala Met Ser Leu Cys Cys Cys
35 40 45

Cys Ala Lys Glu Arg Ile Val Leu Ile Thr Asp Ala Met Gln Ala Ala
50 55 60

Gly Met Pro Asp Gly Arg Tyr Thr Leu Cys Gly Glu Glu Val Gln Met
65 70 75 80

His Gly Gly Val Val Arg Thr Ala Ser Gly Gly Leu Ala Gly Ser Thr
85 90 95

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

Thr Pro Ala Glu Ala Ile His Met Ala Ser Leu His Pro Ala Arg Met
115 120 125

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

Ser Val Val Ala Leu Asp Ser Gly Leu His Val Gln Gln Ile Trp Ile
145 150 155 160

Gln Gly Gln Leu Ala Ser Phe
165