

SEQUENCE LISTING

<110> The Regents of the University of California

<120> MOLECULAR RHEOSTAT FOR COFACTOR BALANCE

<130> 00011-087W01

<140> Not yet assigned

<141> 2017-10-18

<150> US 62/409,731

<151> 2016-10-18

<160> 15

<170> PatentIn version 3.5

<210> 1

<211> 319

<212> PRT

<213> Geobacillus stearothermophilus

<400> 1

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

Asn Ala Ala Ile Arg Ser Val Val Arg Lys Ala Ile Tyr His Gly Val
20 25 30

Glu Val Tyr Gly Val Tyr His Gly Tyr Ala Gly Leu Ile Ala Gly Asn
35 40 45

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

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

Gly Gln Lys Lys Gly Ile Glu Gln Leu Lys Lys His Gly Ile Glu Gly
85 90 95

Leu Val Val Ile Gly Gly Asp Gly Ser Tyr Gln Gly Ala Lys Lys Leu

100

105

110

Thr Glu His Gly Phe Pro Cys Val Gly Val Pro Gly Thr Ile Asp Asn
 115 120 125

Asp Ile Pro Gly Thr Asp Phe Thr Ile Gly Phe Asp Thr Ala Leu Asn
 130 135 140

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

Glu Arg Thr Tyr Val Ile Glu Val Met Gly Arg His Ala Gly Asp Ile
 165 170 175

Ala Leu Trp Ser Gly Leu Ala Gly Gly Ala Glu Thr Ile Leu Ile Pro
 180 185 190

Glu Ala Asp Tyr Asp Met Asn Asp Val Ile Ala Arg Leu Lys Arg Gly
 195 200 205

His Glu Arg Gly Lys Lys His Ser Ile Ile Ile Val Ala Glu Gly Val
 210 215 220

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

Glu Thr Arg Val Thr Val Leu Gly His Val Gln Arg Gly Gly Ser Pro
 245 250 255

Thr Ala Phe Asp Arg Val Leu Ala Ser Arg Leu Gly Ala Arg Ala Val
 260 265 270

Glu Leu Leu Leu Glu Gly Lys Gly Gly Arg Cys Val Gly Ile Gln Asn
 275 280 285

Asn Gln Leu Val Asp His Asp Ile Ala Glu Ala Leu Ala Asn Lys His
 290 295 300

Thr Ile Asp Gln Arg Met Tyr Ala Leu Ser Lys Glu Leu Ser Ile
305 310 315

<210> 2
<211> 253
<212> PRT
<213> Geobacillus stearothermophilus

<400> 2

Met Arg Lys Pro Ile Ile Ala Gly Asn Trp Lys Met His Lys Thr Leu
1 5 10 15

Ala Glu Ala Val Gln Phe Val Glu Asp Val Lys Gly His Val Pro Pro
20 25 30

Ala Asp Glu Val Asp Ser Val Val Cys Ala Pro Phe Leu Phe Leu Asp
35 40 45

Arg Leu Val Gln Ala Ala Asp Gly Thr Asp Leu Lys Ile Gly Ala Gln
50 55 60

Thr Met His Phe Ala Asp Gln Gly Ala Tyr Thr Gly Glu Val Ser Pro
65 70 75 80

Val Met Leu Lys Asp Leu Gly Val Thr Tyr Val Ile Leu Gly His Ser
85 90 95

Glu Arg Arg Gln Met Phe Ala Glu Thr Asp Glu Thr Val Asn Lys Lys
100 105 110

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

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

Ser Gln Val Glu Lys Ala Leu Ala Gly Leu Thr Pro Glu Gln Val Lys
145 150 155 160

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

Ser Ser Thr Pro Glu Asp Ala Asn Ser Val Cys Gly His Ile Arg Ser
180 185 190

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

Gln Tyr Gly Gly Ser Val Lys Pro Asp Asn Ile Arg Asp Phe Leu Ala
210 215 220

Gln Gln Gln Ile Asp Gly Ala Leu Val Gly Gly Ala Ser Leu Glu Pro
225 230 235 240

Ala Ser Phe Leu Gln Leu Val Glu Ala Gly Arg His Glu
245 250

<210> 3
<211> 299
<212> PRT
<213> Staphylococcus aureus

<400> 3

Met Glu Ser Met Asn Lys Glu Gln Leu Glu Lys Met Lys Asn Gly Lys
1 5 10 15

Gly Phe Ile Ala Ala Leu Asp Gln Ser Gly Gly Ser Thr Pro Lys Ala
20 25 30

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

Met Phe Gln Leu Val His Asp Met Arg Thr Arg Val Val Thr Ser Pro
50 55 60

Ser Phe Ser Pro Asp Lys Ile Leu Gly Ala Ile Leu Phe Glu Gln Thr

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

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

Glu Ser Ile Tyr Asp Ala Ser Val Asn Lys Asn
290 295

<210> 4
<211> 449
<212> PRT
<213> Geobacillus thermodenitrificans

<400> 4

Met Thr His Ile Arg Phe Asp Tyr Ser Lys Ala Leu Ala Phe Phe Gly
1 5 10 15

Glu His Glu Leu Thr Tyr Leu Arg Asp Ala Val Lys Val Ala His His
20 25 30

Ser Leu His Glu Lys Thr Gly Val Gly Asn Asp Phe Leu Gly Trp Leu
35 40 45

Asp Trp Pro Val Asn Tyr Asp Lys Glu Glu Phe Ala Arg Ile Lys Gln
50 55 60

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

Ile Gly Gly Ser Tyr Leu Gly Ala Arg Ala Ala Ile Glu Met Leu His
85 90 95

His Ser Phe Tyr Asn Ala Leu Pro Lys Glu Lys Arg Ser Thr Pro Gln
100 105 110

Ile Ile Phe Val Gly Asn Asn Ile Ser Ser Thr Tyr Met Lys Asp Val
115 120 125

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

Ser Gly Thr Thr Thr Glu Pro Ala Ile Ala Phe Arg Ile Phe Arg Lys
145 150 155 160

Leu Leu Glu Asp Lys Tyr Gly Lys Glu Glu Ala Arg Arg Arg Ile Tyr
165 170 175

Ala Thr Thr Asp Arg Ala Arg Gly Ala Leu Arg Thr Leu Ala Asp Glu
180 185 190

Glu Gly Tyr Glu Thr Phe Val Ile Pro Asp Asp Ile Gly Gly Arg Tyr
195 200 205

Ser Val Leu Thr Ala Val Gly Leu Leu Pro Ile Ala Ala Ser Gly Ala
210 215 220

Asp Ile Asp Ala Met Met Glu Gly Ala Ala Lys Ala Arg Glu Asp Phe
225 230 235 240

Ser Arg Ser Glu Leu Glu Glu Asn Ala Ala Tyr Gln Tyr Ala Ala Ile
245 250 255

Arg Asn Ile Leu Tyr Asn Lys Gly Lys Thr Ile Glu Leu Leu Val Asn
260 265 270

Tyr Glu Pro Ala Leu His Tyr Phe Ala Glu Trp Trp Lys Gln Leu Phe
275 280 285

Gly Glu Ser Glu Gly Lys Asp Gln Lys Gly Ile Tyr Pro Ala Ser Ala
290 295 300

Asp Phe Ser Thr Asp Leu His Ser Leu Gly Gln Tyr Ile Gln Glu Gly
305 310 315 320

Arg Arg Asp Leu Phe Glu Thr Val Leu Lys Leu Glu Glu Pro Arg His
325 330 335

Glu Leu Val Ile Glu Ala Glu Glu Ser Asp Leu Asp Gly Leu Asn Tyr
340 345 350

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

Thr Leu Leu Ala His Thr Asp Gly Gly Val Pro Asn Leu Val Val Thr
370 375 380

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

Glu Lys Ala Cys Ala Met Ser Gly Tyr Leu Leu Gly Val Asn Pro Phe
405 410 415

Asp Gln Pro Gly Val Glu Ala Tyr Lys Lys Asn Met Phe Ala Leu Leu
420 425 430

Gly Lys Pro Gly Tyr Glu Glu Leu Lys Asp Glu Leu Glu Lys Arg Leu
435 440 445

Lys

<210> 5

<211> 475

<212> PRT

<213> Streptococcus mutans

<400> 5

Met Thr Lys Gln Tyr Lys Asn Tyr Val Asn Gly Glu Trp Lys Leu Ser
1 5 10 15

Glu Asn Glu Ile Lys Ile Tyr Glu Pro Ala Ser Gly Ala Glu Leu Gly
20 25 30

Ser Val Pro Ala Met Ser Thr Glu Glu Val Asp Tyr Val Tyr Ala Ser
35 40 45

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

Ala Ala Tyr Leu His Lys Val Ala Asp Ile Leu Met Arg Asp Lys Glu
65 70 75 80

Lys Ile Gly Ala Val Leu Ser Lys Glu Val Ala Lys Gly Tyr Lys Ser
85 90 95

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

Glu Glu Gly Leu Arg Met Glu Gly Glu Val Leu Glu Gly Gly Ser Phe
115 120 125

Glu Ala Ala Ser Lys Lys Lys Ile Ala Val Val Arg Arg Glu Pro Val
130 135 140

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

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

Lys Pro Pro Thr Gln Gly Ser Ile Ser Gly Leu Leu Leu Ala Glu Ala
180 185 190

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

Arg Gly Ser Glu Ile Gly Asp Tyr Ile Val Glu His Gln Ala Val Asn
210 215 220

Phe Ile Asn Phe Thr Gly Ser Thr Gly Ile Gly Glu Arg Ile Gly Lys
225 230 235 240

Met Ala Gly Met Arg Pro Ile Met Leu Glu Leu Gly Gly Lys Asp Ser

245

250

255

Ala Ile Val Leu Glu Asp Ala Asp Leu Glu Leu Thr Ala Lys Asn Ile
 260 265 270

Ile Ala Gly Ala Phe Gly Tyr Ser Gly Gln Arg Cys Thr Ala Val Lys
 275 280 285

Arg Val Leu Val Met Glu Ser Val Ala Asp Glu Leu Val Glu Lys Ile
 290 295 300

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

Asp Ile Thr Pro Leu Ile Asp Thr Lys Ser Ala Asp Tyr Val Glu Gly
 325 330 335

Leu Ile Asn Asp Ala Asn Asp Lys Gly Ala Ala Ala Leu Thr Glu Ile
 340 345 350

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

Thr Asp Met Arg Leu Ala Trp Glu Glu Pro Phe Gly Pro Val Leu Pro
 370 375 380

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

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

Ala Phe Gly Ile Ala Glu Gln Leu Glu Val Gly Thr Val His Ile Asn
 420 425 430

Asn Lys Thr Gln Arg Gly Thr Asp Asn Phe Pro Phe Leu Gly Ala Lys
 435 440 445

Lys Ser Gly Ala Gly Ile Gln Gly Val Lys Tyr Ser Ile Glu Ala Met
450 455 460

Thr Thr Val Lys Ser Val Val Phe Asp Ile Lys
465 470 475

<210> 6
<211> 335
<212> PRT
<213> Geobacillus stearothermophilus

<400> 6

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

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

Asn Asp Leu Thr Asp Ala Asn Thr Leu Ala His Leu Leu Lys Tyr Asp
35 40 45

Ser Val His Gly Arg Leu Asp Ala Glu Val Ser Val Asn Gly Asn Asn
50 55 60

Leu Val Val Asn Gly Lys Glu Ile Ile Val Lys Ala Glu Arg Asp Pro
65 70 75 80

Glu Asn Leu Ala Trp Gly Glu Ile Gly Val Asp Ile Val Val Glu Ser
85 90 95

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

Gly Ala Lys Lys Val Ile Ile Ser Ala Pro Ala Lys Asn Glu Asp Ile
115 120 125

Thr Ile Val Met Gly Val Asn Gln Asp Lys Tyr Asp Pro Lys Ala His
130 135 140

His Val Ile Ser Asn Ala Ser Cys Thr Thr Asn Cys Leu Ala Pro Phe
145 150 155 160

Ala Lys Val Leu His Glu Gln Phe Gly Ile Val Arg Gly Met Met Thr
165 170 175

Thr Val His Ser Tyr Thr Asn Asp Gln Arg Ile Leu Asp Leu Pro His
180 185 190

Lys Asp Leu Arg Arg Ala Arg Ala Ala Ala Glu Ser Ile Ile Pro Thr
195 200 205

Thr Thr Gly Ala Ala Lys Ala Val Ala Leu Val Leu Pro Glu Leu Lys
210 215 220

Gly Lys Leu Asn Gly Met Ala Met Arg Val Pro Thr Pro Asn Val Ser
225 230 235 240

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

Val Asn Ala Ala Leu Lys Ala Ala Ala Glu Gly Glu Leu Lys Gly Ile
260 265 270

Leu Ala Tyr Ser Glu Glu Pro Leu Val Ser Arg Asp Tyr Asn Gly Ser
275 280 285

Thr Val Ser Ser Thr Ile Asp Ala Leu Ser Thr Met Val Ile Asp Gly
290 295 300

Lys Met Val Lys Val Val Ser Trp Tyr Asp Asn Glu Thr Gly Tyr Ser
305 310 315 320

His Arg Val Val Asp Leu Ala Ala Tyr Ile Ala Ser Lys Gly Leu
325 330 335

<210> 7
<211> 394
<212> PRT
<213> Geobacillus stearothermophilus

<400> 7

Met Asn Lys Lys Thr Ile Arg Asp Val Asp Val Arg Gly Lys Arg Val
1 5 10 15

Phe Cys Arg Val Asp Phe Asn Val Pro Met Glu Gln Gly Ala Ile Thr
20 25 30

Asp Asp Thr Arg Ile Arg Ala Ala Leu Pro Thr Ile Arg Tyr Leu Ile
35 40 45

Glu His Gly Ala Lys Val Ile Leu Ala Ser His Leu Gly Arg Pro Lys
50 55 60

Gly Lys Val Val Glu Glu Leu Arg Leu Asp Ala Val Ala Lys Arg Leu
65 70 75 80

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

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

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

Glu Leu Ala Lys Ala Phe Ala Glu Leu Ala Asp Leu Tyr Val Asn Asp
130 135 140

Ala Phe Gly Ala Ala His Arg Ala His Ala Ser Thr Glu Gly Ile Ala
145 150 155 160

His Tyr Leu Pro Ala Val Ala Gly Phe Leu Met Glu Lys Glu Leu Glu
165 170 175

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

Ile Gly Gly Ala Lys Val Lys Asp Lys Ile Gly Val Ile Asp Asn Leu
195 200 205

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

Phe Val Lys Ala Leu Gly His Asp Val Gly Lys Ser Leu Leu Glu Glu
225 230 235 240

Asp Lys Ile Glu Leu Ala Lys Ser Phe Met Glu Lys Ala Lys Glu Lys
245 250 255

Gly Val Arg Phe Tyr Met Pro Val Asp Val Val Val Ala Asp Arg Phe
260 265 270

Ala Asn Asp Ala Asn Thr Lys Val Val Pro Ile Asp Ala Ile Pro Ala
275 280 285

Asp Trp Ser Ala Leu Asp Ile Gly Pro Lys Thr Arg Glu Leu Tyr Arg
290 295 300

Asp Val Ile Arg Glu Ser Lys Leu Val Val Trp Asn Gly Pro Met Gly
305 310 315 320

Val Phe Glu Met Asp Ala Phe Ala His Gly Thr Lys Ala Ile Ala Glu
325 330 335

Ala Leu Ala Glu Ala Leu Asp Thr Tyr Ser Val Ile Gly Gly Gly Asp
340 345 350

Ser Ala Ala Ala Val Glu Lys Phe Gly Leu Ala Asp Lys Met Asp His
355 360 365

Ile Ser Thr Gly Gly Gly Ala Ser Leu Glu Phe Met Glu Gly Lys Gln

370

375

380

Leu Pro Gly Val Val Ala Leu Glu Asp Lys
 385 390

<210> 8

<211> 511

<212> PRT

<213> Geobacillus stearothermophilus

<400> 8

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

Arg Asp Glu Thr Tyr Gly Asn Ala Val Ala Gln Ala Asn Lys Pro Asn
 20 25 30

Phe Asp Arg Tyr Trp Asn Glu Tyr Pro His Thr Thr Leu Lys Ala Cys
 35 40 45

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

Gly His Leu Asn Ile Gly Ala Gly Arg Ile Val Tyr Gln Ser Leu Thr
 65 70 75 80

Arg Ile Asn Ile Ala Ile Arg Glu Gly Glu Phe Asp Arg Asn Glu Thr
 85 90 95

Phe Leu Ala Ala Met Asn His Val Lys Gln His Gly Thr Ser Leu His
 100 105 110

Leu Phe Gly Leu Leu Ser Asp Gly Gly Val His Ser His Ile His His
 115 120 125

Leu Tyr Ala Leu Leu Arg Leu Ala Ala Lys Glu Gly Val Lys Arg Val
 130 135 140

Tyr Ile His Gly Phe Leu Asp Gly Arg Asp Val Gly Pro Gln Thr Ala
145 150 155 160

Pro Gln Tyr Ile Lys Glu Leu Gln Glu Lys Ile Lys Glu Tyr Gly Val
165 170 175

Gly Glu Ile Ala Thr Leu Ser Gly Arg Tyr Tyr Ser Met Asp Arg Asp
180 185 190

Lys Arg Trp Asp Arg Val Glu Lys Ala Tyr Arg Ala Met Val Tyr Gly
195 200 205

Glu Gly Pro Thr Tyr Arg Asp Pro Leu Glu Cys Ile Glu Asp Ser Tyr
210 215 220

Lys His Gly Ile Tyr Asp Glu Phe Val Leu Pro Ser Val Ile Val Arg
225 230 235 240

Glu Asp Gly Arg Pro Val Ala Thr Ile Gln Asp Asn Asp Ala Ile Ile
245 250 255

Phe Tyr Asn Phe Arg Pro Asp Arg Ala Ile Gln Ile Ser Asn Thr Phe
260 265 270

Thr Asn Glu Asp Phe Arg Glu Phe Asp Arg Gly Pro Lys His Pro Lys
275 280 285

His Leu Phe Phe Val Cys Leu Thr His Phe Ser Glu Thr Val Lys Gly
290 295 300

Tyr Val Ala Phe Lys Pro Thr Asn Leu Asp Asn Thr Ile Gly Glu Val
305 310 315 320

Leu Ser Gln His Gly Leu Arg Gln Leu Arg Ile Ala Glu Thr Glu Lys
325 330 335

Tyr Pro His Val Thr Phe Phe Met Ser Gly Gly Arg Glu Glu Lys Phe
340 345 350

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

Asp Leu Lys Pro Glu Met Ser Ala Tyr Glu Val Thr Asp Ala Leu Leu
370 375 380

Lys Glu Ile Glu Ala Asp Lys Tyr Asp Ala Ile Ile Leu Asn Tyr Ala
385 390 395 400

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

Ala Val Glu Ala Val Asp Glu Cys Leu Gly Lys Val Val Asp Ala Ile
420 425 430

Leu Ala Lys Gly Gly Ile Ala Ile Ile Thr Ala Asp His Gly Asn Ala
435 440 445

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

Asn Pro Val Pro Val Ile Val Thr Lys Lys Gly Ile Lys Leu Arg Asp
465 470 475 480

Gly Gly Ile Leu Gly Asp Leu Ala Pro Thr Met Leu Asp Leu Leu Gly
485 490 495

Leu Pro Gln Pro Lys Glu Met Thr Gly Lys Ser Leu Ile Val Lys
500 505 510

<210> 9

<211> 432

<212> PRT

<213> Escherichia coli

<400> 9

Met Ser Lys Ile Val Lys Ile Ile Gly Arg Glu Ile Ile Asp Ser Arg

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

Glu Gly Gly Tyr Ala Pro Asn Leu Gly Ser Asn Ala Glu Ala Leu Ala
210 215 220

Val Ile Ala Glu Ala Val Lys Ala Ala Gly Tyr Glu Leu Gly Lys Asp
225 230 235 240

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

Lys Tyr Val Leu Ala Gly Glu Gly Asn Lys Ala Phe Thr Ser Glu Glu
260 265 270

Phe Thr His Phe Leu Glu Glu Leu Thr Lys Gln Tyr Pro Ile Val Ser
275 280 285

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

Thr Lys Val Leu Gly Asp Lys Ile Gln Leu Val Gly Asp Asp Leu Phe
305 310 315 320

Val Thr Asn Thr Lys Ile Leu Lys Glu Gly Ile Glu Lys Gly Ile Ala
325 330 335

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

Leu Ala Ala Ile Lys Met Ala Lys Asp Ala Gly Tyr Thr Ala Val Ile
355 360 365

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

Val Gly Thr Ala Ala Gly Gln Ile Lys Thr Gly Ser Met Ser Arg Ser
385 390 395 400

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

405

410

415

Gly Glu Lys Ala Pro Tyr Asn Gly Arg Lys Glu Ile Lys Gly Gln Ala
 420 425 430

<210> 10

<211> 470

<212> PRT

<213> Escherichia coli

<400> 10

Met Lys Lys Thr Lys Ile Val Cys Thr Ile Gly Pro Lys Thr Glu Ser
 1 5 10 15

Glu Glu Met Leu Ala Lys Met Leu Asp Ala Gly Met Asn Val Met Arg
 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
435 440 445

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> 11
<211> 571
<212> PRT
<213> Bacillus subtilis

<400> 11

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

Gly Ala Glu Leu Val Val Asp Cys Leu Val Glu Gln Gly Val Thr His
20 25 30

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

35

40

45

Gln Asp Lys Gly Pro Glu Ile Ile Val Ala Arg His Glu Gln Asn Ala
 50 55 60

Ala Phe Met Ala Gln Ala Val Gly Arg Leu Thr Gly Lys Pro Gly Val
 65 70 75 80

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

Leu Thr Ala Asn Thr Glu Gly Asp Pro Val Val Ala Leu Ala Gly Asn
 100 105 110

Val Ile Arg Ala Asp Arg Leu Lys Arg Thr His Gln Ser Leu Asp Asn
 115 120 125

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

Val Lys Asn Ile Pro Glu Ala Val Thr Asn Ala Phe Arg Ile Ala Ser
 145 150 155 160

Ala Gly Gln Ala Gly Ala Ala Phe Val Ser Phe Pro Gln Asp Val Val
 165 170 175

Asn Glu Val Thr Asn Thr Lys Asn Val Arg Ala Val Ala Ala Pro Lys
 180 185 190

Leu Gly Pro Ala Ala Asp Asp Ala Ile Ser Ala Ala Ile Ala Lys Ile
 195 200 205

Gln Thr Ala Lys Leu Pro Val Val Leu Val Gly Met Lys Gly Gly Arg
 210 215 220

Pro Glu Ala Ile Lys Ala Val Arg Lys Leu Leu Lys Lys Val Gln Leu
 225 230 235 240

Pro Phe Val Glu Thr Tyr Gln Ala Ala Gly Thr Leu Ser Arg Asp Leu
245 250 255

Glu Asp Gln Tyr Phe Gly Arg Ile Gly Leu Phe Arg Asn Gln Pro Gly
260 265 270

Asp Leu Leu Leu Glu Gln Ala Asp Val Val Leu Thr Ile Gly Tyr Asp
275 280 285

Pro Ile Glu Tyr Asp Pro Lys Phe Trp Asn Ile Asn Gly Asp Arg Thr
290 295 300

Ile Ile His Leu Asp Glu Ile Ile Ala Asp Ile Asp His Ala Tyr Gln
305 310 315 320

Pro Asp Leu Glu Leu Ile Gly Asp Ile Pro Ser Thr Ile Asn His Ile
325 330 335

Glu His Asp Ala Val Lys Val Glu Phe Ala Glu Arg Glu Gln Lys Ile
340 345 350

Leu Ser Asp Leu Lys Gln Tyr Met His Glu Gly Glu Gln Val Pro Ala
355 360 365

Asp Trp Lys Ser Asp Arg Ala His Pro Leu Glu Ile Val Lys Glu Leu
370 375 380

Arg Asn Ala Val Asp Asp His Val Thr Val Thr Cys Asp Ile Gly Ser
385 390 395 400

His Ala Ile Trp Met Ser Arg Tyr Phe Arg Ser Tyr Glu Pro Leu Thr
405 410 415

Leu Met Ile Ser Asn Gly Met Gln Thr Leu Gly Val Ala Leu Pro Trp
420 425 430

Ala Ile Gly Ala Ser Leu Val Lys Pro Gly Glu Lys Val Val Ser Val

435

440

445

Ser Gly Asp Gly Gly Phe Leu Phe Ser Ala Met Glu Leu Glu Thr Ala
 450 455 460

Val Arg Leu Lys Ala Pro Ile Val His Ile Val Trp Asn Asp Ser Thr
 465 470 475 480

Tyr Asp Met Val Ala Phe Gln Gln Leu Lys Lys Tyr Asn Arg Thr Ser
 485 490 495

Ala Val Asp Phe Gly Asn Ile Asp Ile Val Lys Tyr Ala Glu Ser Phe
 500 505 510

Gly Ala Thr Gly Leu Arg Val Glu Ser Pro Asp Gln Leu Ala Asp Val
 515 520 525

Leu Arg Gln Gly Met Asn Ala Glu Gly Pro Val Ile Ile Asp Val Pro
 530 535 540

Val Asp Tyr Ser Asp Asn Ile Asn Leu Ala Ser Asp Lys Leu Pro Lys
 545 550 555 560

Glu Phe Gly Glu Leu Met Lys Thr Lys Ala Leu
 565 570

<210> 12

<211> 491

<212> PRT

<213> Escherichia coli

<400> 12

Met Ala Asn Tyr Phe Asn Thr Leu Asn Leu Arg Gln Gln Leu Ala Gln
 1 5 10 15

Leu Gly Lys Cys Arg Phe Met Gly Arg Asp Glu Phe Ala Asp Gly Ala
 20 25 30

Ser Tyr Leu Gln Gly Lys Lys Val Val Ile Val Gly Cys Gly Ala Gln
35 40 45

Gly Leu Asn Gln Gly Leu Asn Met Arg Asp Ser Gly Leu Asp Ile Ser
50 55 60

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

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

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

Asp Val Val Arg Thr Val Gln Pro Leu Met Lys Asp Gly Ala Ala Leu
115 120 125

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

Lys Asp Ile Thr Val Val Met Val Ala Pro Lys Cys Pro Gly Thr Glu
145 150 155 160

Val Arg Glu Glu Tyr Lys Arg Gly Phe Gly Val Pro Thr Leu Ile Ala
165 170 175

Val His Pro Glu Asn Asp Pro Lys Gly Glu Gly Met Ala Ile Ala Lys
180 185 190

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

Ser Phe Val Ala Glu Val Lys Ser Asp Leu Met Gly Glu Gln Thr Ile
210 215 220

Leu Cys Gly Met Leu Gln Ala Gly Ser Leu Leu Cys Phe Asp Lys Leu
225 230 235 240

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

Gly Trp Glu Thr Ile Thr Glu Ala Leu Lys Gln Gly Gly Ile Thr Leu
260 265 270

Met Met Asp Arg Leu Ser Asn Pro Ala Lys Leu Arg Ala Tyr Ala Leu
275 280 285

Ser Glu Gln Leu Lys Glu Ile Met Ala Pro Leu Phe Gln Lys His Met
290 295 300

Asp Asp Ile Ile Ser Gly Glu Phe Ser Ser Gly Met Met Ala Asp Trp
305 310 315 320

Ala Asn Asp Asp Lys Lys Leu Leu Thr Trp Arg Glu Glu Thr Gly Lys
325 330 335

Thr Ala Phe Glu Thr Ala Pro Gln Tyr Glu Gly Lys Ile Gly Glu Gln
340 345 350

Glu Tyr Phe Asp Lys Gly Val Leu Met Ile Ala Met Val Lys Ala Gly
355 360 365

Val Glu Leu Ala Phe Glu Thr Met Val Asp Ser Gly Ile Ile Glu Glu
370 375 380

Ser Ala Tyr Tyr Glu Ser Leu His Glu Leu Pro Leu Ile Ala Asn Thr
385 390 395 400

Ile Ala Arg Lys Arg Leu Tyr Glu Met Asn Val Val Ile Ser Asp Thr
405 410 415

Ala Glu Tyr Gly Asn Tyr Leu Phe Ser Tyr Ala Cys Val Pro Leu Leu
420 425 430

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

Pro Glu Gly Ala Val Asp Asn Gly Gln Leu Arg Asp Val Asn Glu Ala
450 455 460

Ile Arg Ser His Ala Ile Glu Gln Val Gly Lys Lys Leu Arg Gly Tyr
465 470 475 480

Met Thr Asp Met Lys Arg Ile Ala Val Ala Gly
485 490

<210> 13
<211> 616
<212> PRT
<213> Escherichia coli

<400> 13

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

Gly Ala Arg Ala Leu Trp Arg Ala Thr Gly Met Thr Asp Ala Asp Phe
20 25 30

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

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

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

Asp Gly Ile Ala Met Gly His Gly Gly Met Leu Tyr Ser Leu Pro Ser
85 90 95

Arg Glu Leu Ile Ala Asp Ser Val Glu Tyr Met Val Asn Ala His Cys
100 105 110

Ala Asp Ala Met Val Cys Ile Ser Asn Cys Asp Lys Ile Thr Pro Gly
115 120 125

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

Gly Gly Pro Met Glu Ala Gly Lys Thr Lys Leu Ser Asp Gln Ile Ile
145 150 155 160

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

Ser Asp Ser Gln Ser Asp Gln Val Glu Arg Ser Ala Cys Pro Thr Cys
180 185 190

Gly Ser Cys Ser Gly Met Phe Thr Ala Asn Ser Met Asn Cys Leu Thr
195 200 205

Glu Ala Leu Gly Leu Ser Gln Pro Gly Asn Gly Ser Leu Leu Ala Thr
210 215 220

His Ala Asp Arg Lys Gln Leu Phe Leu Asn Ala Gly Lys Arg Ile Val
225 230 235 240

Glu Leu Thr Lys Arg Tyr Tyr Glu Gln Asn Asp Glu Ser Ala Leu Pro
245 250 255

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

Ile Ala Met Gly Gly Ser Thr Asn Thr Val Leu His Leu Leu Ala Ala
275 280 285

Ala Gln Glu Ala Glu Ile Asp Phe Thr Met Ser Asp Ile Asp Lys Leu
290 295 300

Ser Arg Lys Val Pro Gln Leu Cys Lys Val Ala Pro Ser Thr Gln Lys

305		310		315		320									
Tyr	His	Met	Glu	Asp	Val	His	Arg	Ala	Gly	Gly	Val	Ile	Gly	Ile	Leu
			325						330					335	
Gly	Glu	Leu	Asp	Arg	Ala	Gly	Leu	Leu	Asn	Arg	Asp	Val	Lys	Asn	Val
			340					345					350		
Leu	Gly	Leu	Thr	Leu	Pro	Gln	Thr	Leu	Glu	Gln	Tyr	Asp	Val	Met	Leu
		355					360					365			
Thr	Gln	Asp	Asp	Ala	Val	Lys	Asn	Met	Phe	Arg	Ala	Gly	Pro	Ala	Gly
	370					375					380				
Ile	Arg	Thr	Thr	Gln	Ala	Phe	Ser	Gln	Asp	Cys	Arg	Trp	Asp	Thr	Leu
385					390					395					400
Asp	Asp	Asp	Arg	Ala	Asn	Gly	Cys	Ile	Arg	Ser	Leu	Glu	His	Ala	Tyr
				405					410					415	
Ser	Lys	Asp	Gly	Gly	Leu	Ala	Val	Leu	Tyr	Gly	Asn	Phe	Ala	Glu	Asn
			420					425					430		
Gly	Cys	Ile	Val	Lys	Thr	Ala	Gly	Val	Asp	Asp	Ser	Ile	Leu	Lys	Phe
		435					440					445			
Thr	Gly	Pro	Ala	Lys	Val	Tyr	Glu	Ser	Gln	Asp	Asp	Ala	Val	Glu	Ala
	450					455					460				
Ile	Leu	Gly	Gly	Lys	Val	Val	Ala	Gly	Asp	Val	Val	Val	Ile	Arg	Tyr
465					470					475					480
Glu	Gly	Pro	Lys	Gly	Gly	Pro	Gly	Met	Gln	Glu	Met	Leu	Tyr	Pro	Thr
				485					490					495	
Ser	Phe	Leu	Lys	Ser	Met	Gly	Leu	Gly	Lys	Ala	Cys	Ala	Leu	Ile	Thr
			500					505					510		

Asp Gly Arg Phe Ser Gly Gly Thr Ser Gly Leu Ser Ile Gly His Val
515 520 525

Ser Pro Glu Ala Ala Ser Gly Gly Ser Ile Gly Leu Ile Glu Asp Gly
530 535 540

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

Ser Asp Ala Glu Leu Ala Ala Arg Arg Glu Ala Gln Asp Ala Arg Gly
565 570 575

Asp Lys Ala Trp Thr Pro Lys Asn Arg Glu Arg Gln Val Ser Phe Ala
580 585 590

Leu Arg Ala Tyr Ala Ser Leu Ala Thr Ser Ala Asp Lys Gly Ala Val
595 600 605

Arg Asp Lys Ser Lys Leu Gly Gly
610 615

<210> 14

<211> 548

<212> PRT

<213> Lactococcus lactis

<400> 14

Met Tyr Thr Val Gly Asp Tyr Leu Leu Asp Arg Leu His Glu Leu Gly
1 5 10 15

Ile Glu Glu Ile Phe Gly Val Pro Gly Asp Tyr Asn Leu Gln Phe Leu
20 25 30

Asp Gln Ile Ile Ser Arg Lys Asp Met Lys Trp Val Gly Asn Ala Asn
35 40 45

Glu Leu Asn Ala Ser Tyr Met Ala Asp Gly Tyr Ala Arg Thr Lys Lys
50 55 60

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

Asn Gly Leu Ala Gly Ser Tyr Ala Glu Asn Leu Pro Val Val Glu Ile
85 90 95

Val Gly Ser Pro Thr Ser Lys Val Gln Asn Glu Gly Lys Phe Val His
100 105 110

His Thr Leu Ala Asp Gly Asp Phe Lys His Phe Met Lys Met His Glu
115 120 125

Pro Val Thr Ala Ala Arg Thr Leu Leu Thr Ala Glu Asn Ala Thr Val
130 135 140

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

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

Ser Leu Pro Leu Lys Lys Glu Asn Ser Thr Ser Asn Thr Ser Asp Gln
180 185 190

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

Ile Val Ile Thr Gly His Glu Ile Ile Ser Phe Gly Leu Glu Lys Thr
210 215 220

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

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

Tyr Asn Gly Lys Leu Ser Glu Pro Asn Leu Lys Glu Phe Val Glu Ser
260 265 270

Ala Asp Phe Ile Leu Met Leu Gly Val Lys Leu Thr Asp Ser Ser Thr
275 280 285

Gly Ala Phe Thr His His Leu Asn Glu Asn Lys Met Ile Ser Leu Asn
290 295 300

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

Glu Ser Leu Ile Ser Ser Leu Leu Asp Leu Ser Glu Ile Glu Tyr Lys
325 330 335

Gly Lys Tyr Ile Asp Lys Lys Gln Glu Asp Phe Val Pro Ser Asn Ala
340 345 350

Leu Leu Ser Gln Asp Arg Leu Trp Gln Ala Val Glu Asn Leu Thr Gln
355 360 365

Ser Asn Glu Thr Ile Val Ala Glu Gln Gly Thr Ser Phe Phe Gly Ala
370 375 380

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

Trp Gly Ser Ile Gly Tyr Thr Phe Pro Ala Ala Leu Gly Ser Gln Ile
405 410 415

Ala Asp Lys Glu Ser Arg His Leu Leu Phe Ile Gly Asp Gly Ser Leu
420 425 430

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

Pro Ile Cys Phe Ile Ile Asn Asn Asp Gly Tyr Thr Val Glu Arg Glu
450 455 460

Ile His Gly Pro Asn Gln Ser Tyr Asn Asp Ile Pro Met Trp Asn Tyr
465 470 475 480

Ser Lys Leu Pro Glu Ser Phe Gly Ala Thr Glu Glu Arg Val Val Ser
485 490 495

Lys Ile Val Arg Thr Glu Asn Glu Phe Val Ser Val Met Lys Glu Ala
500 505 510

Gln Ala Asp Pro Asn Arg Met Tyr Trp Ile Glu Leu Ile Leu Ala Lys
515 520 525

Glu Asp Ala Pro Lys Val Leu Lys Lys Met Gly Lys Leu Phe Ala Glu
530 535 540

Gln Asn Lys Ser
545

<210> 15
<211> 349
<212> PRT
<213> Escherichia coli

<400> 15

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

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

Glu Ile Ala Tyr Cys Gly Val Cys His Ser Asp Leu His Gln Val Arg
35 40 45

Ser Glu Trp Ala Gly Thr Val Tyr Pro Cys Val Pro Gly His Glu Ile
50 55 60

Val Gly Arg Val Val Ala Val Gly Asp Gln Val Glu Lys Tyr Ala Pro

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

Pro His Lys Ser Pro Glu Val Phe Asn Leu Ile Met Lys Arg Arg Ala
275 280 285

Ile Ala Gly Ser Met Ile Gly Gly Ile Pro Glu Thr Gln Glu Met Leu
290 295 300

Asp Phe Cys Ala Glu His Gly Ile Val Ala Asp Ile Glu Met Ile Arg
305 310 315 320

Ala Asp Gln Ile Asn Glu Ala Tyr Glu Arg Met Leu Arg Gly Asp Val
325 330 335

Lys Tyr Arg Phe Val Ile Asp Asn Arg Thr Leu Thr Asp
340 345