

Sequence listing
SEQUENCE LISTING

<110> Erber Aktiengesellschaft
<120> Polypeptid zur hydrolytischen Spaltung von Zearalenon und / oder Zearalenon Derivaten
<130> P05341PCT
<160> 69
<170> PatentIn version 3.5
<210> 1
<211> 328
<212> PRT
<213> Rhodococcus erythropolis

<400> 1

Met Ala Glu Glu Gly Thr Arg Ser Glu Ala Ala Asp Ala Ala Thr Gln
1 5 10 15

Ala Arg Gln Leu Pro Asp Ser Arg Asn Ile Phe Val Ser His Arg Phe
20 25 30

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

Ala Gly Ser Pro Asp Asn Pro Ala Leu Leu Leu Leu Pro Glu Gln Thr
50 55 60

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

Phe His Val Phe Ala Val Asp Ile Arg Gly Gln Gly Arg Ser Thr Trp
85 90 95

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

Phe Ile Ala Leu Val Ile Lys Arg Pro Val Val Val Ala Gly Asn Ser
115 120 125

Ser Gly Gly Leu Leu Ala Ala Trp Leu Ser Ala Tyr Ala Met Pro Gly
130 135 140

Gln Ile Arg Ala Ala Leu Cys Glu Asp Ala Pro Phe Phe Ala Ser Glu
145 150 155 160

Leu Val Pro Ala Tyr Gly His Ser Val Leu Gln Ala Ala Gly Pro Ala
165 170 175

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

Sequence listing

Trp Lys Gly Phe Val Glu Ala Ala Lys Ala Ser Pro Ala Lys Ala Met
 195 200 205

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

Asp Pro Glu Trp Gly Arg Ala Phe Phe Glu Gly Thr Val Ala Leu His
 225 230 235 240

Cys Pro His Asp Arg Met Leu Ser Gln Val Lys Thr Pro Ile Leu Ile
 245 250 255

Thr His His Ala Arg Thr Ile Asp Pro Glu Thr Gly Glu Leu Leu Gly
 260 265 270

Ala Leu Ser Asp Leu Gln Ala Glu His Ala Gln Asp Ile Ile Arg Ser
 275 280 285

Ala Gly Val Arg Val Asp Tyr Gln Ser His Pro Asp Ala Leu His Met
 290 295 300

Met His Leu Phe Asp Pro Ala Arg Tyr Ala Glu Ile Leu Thr Ser Trp
 305 310 315 320

Ser Ala Thr Leu Pro Ala Asn Asp
 325

<210> 2
 <211> 308
 <212> PRT
 <213> Streptomyces violaceusniger

<400> 2

Met Ala Asp Pro Ala Gln Arg Asp Val Tyr Val Pro His Ala Tyr Pro
 1 5 10 15

Glu Lys Gln Ala Asp Leu Gly Glu Ile Thr Met Asn Tyr Ala Glu Ala
 20 25 30

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

Ser Trp Trp Gly Tyr Glu Glu Ala Met Gly Leu Leu Ala Glu Asn Phe
 50 55 60

His Val Tyr Ala Val Asp Leu Arg Gly Gln Gly Arg Ser Ser Trp Ala
 65 70 75 80

Pro Lys Arg Tyr Ser Leu Asp Asn Phe Gly Asn Asp Leu Val Arg Phe
 85 90 95

Ile Ala Leu Val Val Lys Arg Pro Val Ile Val Ala Gly Asn Ser Ser

Sequence listing

100 105 110

Gly Gly Val Leu Ala Ala Trp Leu Ser Ala Tyr Ser Met Pro Gly Gln
115 120 125

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

Val Thr Thr Cys Gly His Ser Ile Arg Gln Ala Ala Gly Pro Met Phe
145 150 155 160

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

Thr Gly Tyr Cys Arg Ala Ala Asp Ala Ser Ser Ser Pro Met Ala Arg
180 185 190

Tyr Phe Val Ala Asp Glu Ile Pro Gln His Met Arg Glu Tyr Asp Pro
195 200 205

Glu Trp Ala Arg Ala Phe Trp Glu Gly Thr Val Ala Leu His Cys Pro
210 215 220

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

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

Ser Asp Glu Gln Ala Ala Arg Ala Arg Leu Leu Met Glu Ser Ala Gly
260 265 270

Val Lys Val Asp Tyr Ala Ser Val Pro Asp Ala Leu His Met Met His
275 280 285

Gln Phe Asp Pro Pro Arg Tyr Val Glu Ile Phe Thr Gln Trp Ala Ala
290 295 300

Thr Leu Ala Ala
305

<210> 3
<211> 309
<212> PRT
<213> Streptomyces coelicolor

<400> 3

Met Val Thr Ser Pro Ala Leu Arg Asp Val His Val Pro His Ala Tyr
1 5 10 15

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

Sequence listing

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

Gly Ser Trp Trp Ser Tyr Glu Glu Ala Met Gly Leu Leu Ala Glu His
50 55 60

Phe His Val Tyr Ala Val Asp Leu Arg Gly Gln Gly Arg Ser Ser Trp
65 70 75 80

Thr Pro Lys Arg Tyr Ser Leu Asp Asn Phe Gly Asn Asp Leu Val Arg
85 90 95

Phe Ile Ala Leu Val Val Arg Arg Pro Val Val Val Ala Gly Asn Ser
100 105 110

Ser Gly Gly Val Leu Ala Ala Trp Leu Ser Ala Tyr Ser Met Pro Gly
115 120 125

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

Leu Val Pro Ala His Gly His Ser Val Arg Gln Gly Ala Gly Pro Val
145 150 155 160

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

Trp Glu Gly Phe Arg Ser Ala Ala Asp Ala Ser Ala Ser Pro Met Ala
180 185 190

Arg Ser Phe Val Ala Asp Thr Ile Pro Gln His Leu Lys Glu Tyr Asp
195 200 205

Pro Glu Trp Ala Arg Ala Phe Tyr Glu Gly Thr Val Gly Leu Asn Cys
210 215 220

Pro His Glu Arg Met Leu Asn Arg Val Asn Thr Pro Val Leu Leu Thr
225 230 235 240

His His Met Arg Gly Thr Asp Pro Glu Thr Gly Asn Leu Leu Gly Ala
245 250 255

Leu Ser Asp Glu Gln Ala Ala Gln Val Arg Arg Leu Met Glu Ser Ala
260 265 270

Gly Val Lys Val Asp Tyr Glu Ser Val Pro Asp Ala Ser His Met Met
275 280 285

His Gln Ser Asp Pro Ala Arg Tyr Ala Glu Ile Leu Thr Pro Trp Thr
290 295 300

Sequence listing

Ala Ala Leu Ala Pro
305

<210> 4
<211> 309
<212> PRT
<213> Streptomyces rapamycinicus
<400> 4

Met Val Thr Ser Pro Ala Leu Arg Asp Val His Val Pro His Ala Tyr
1 5 10 15

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

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

Gly Ser Trp Trp Ser Tyr Glu Glu Ala Met Gly Leu Leu Ala Glu His
50 55 60

Phe His Val Tyr Ala Val Asp Leu Arg Gly Gln Gly Arg Ser Ser Trp
65 70 75 80

Thr Pro Lys Arg Tyr Ser Leu Asp Asn Phe Gly Asn Asp Leu Val Arg
85 90 95

Phe Ile Ala Leu Val Val Lys Arg Pro Val Val Val Ala Gly Asn Ser
100 105 110

Ser Gly Gly Val Leu Ala Ala Trp Leu Ser Ala Tyr Ser Met Pro Gly
115 120 125

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

Leu Val Pro Ala His Gly His Ser Val Arg Gln Gly Ala Gly Pro Val
145 150 155 160

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

Trp Glu Gly Phe Cys Arg Ala Ala Gly Ala Ser Ala Ser Pro Met Ala
180 185 190

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

Pro Glu Trp Ala Arg Ala Phe His Glu Gly Thr Val Gly Leu Asn Cys
210 215 220

Sequence listing

Pro His Glu Arg Met Leu Gly Arg Val Asn Thr Pro Val Leu Leu Thr
225 230 235 240

His His Met Arg Gly Thr Asp Pro Glu Thr Gly Asn Leu Leu Gly Ala
245 250 255

Leu Ser Asp Glu Gln Ala Ala Gln Ala Arg Leu Leu Met Glu Ser Ala
260 265 270

Gly Val Arg Val Asp Tyr Glu Ser Val Pro Asp Ala Ser His Met Met
275 280 285

His Gln Ser Asp Pro Ala Arg Tyr Ala Glu Ile Phe Thr Arg Trp Ala
290 295 300

Ala Ala Leu Ala Pro
305

<210> 5
<211> 309
<212> PRT
<213> Streptomyces lividans

<400> 5

Met Val Thr Ser Pro Ala Leu Arg Asp Val His Val Pro His Ala Tyr
1 5 10 15

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

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

Gly Ser Trp Trp Ser Tyr Glu Glu Ala Met Gly Leu Leu Ala Glu His
50 55 60

Phe His Val Tyr Ala Val Asp Leu Arg Gly Gln Gly Arg Ser Ser Trp
65 70 75 80

Thr Pro Lys Arg Tyr Ser Leu Asp Asn Phe Gly Asn Asp Leu Val Arg
85 90 95

Phe Met Ala Leu Val Val Arg Arg Pro Val Val Val Ala Gly Asn Ser
100 105 110

Ser Gly Gly Val Leu Ala Ala Trp Leu Ser Ala Tyr Ser Met Pro Gly
115 120 125

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

Sequence listing

Leu Val Pro Ala His Gly His Ser Val Arg Gln Gly Ala Gly Pro Val
145 150 155 160

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

Trp Glu Gly Phe Arg Ser Ala Ala Gly Ala Ser Ala Ser Pro Met Ala
180 185 190

Arg Ser Phe Val Ala Asp Thr Ile Pro Gln His Leu Lys Glu Tyr Asp
195 200 205

Pro Glu Trp Ala Arg Ala Phe Tyr Glu Gly Thr Val Gly Leu Asn Cys
210 215 220

Pro His Glu Arg Met Leu Asn Arg Val Asn Thr Pro Val Leu Leu Thr
225 230 235 240

His His Met Arg Gly Thr Asp Pro Glu Thr Gly Asn Leu Leu Gly Ala
245 250 255

Leu Ser Asp Glu Gln Ala Ala Gln Ala Arg Arg Leu Met Glu Ser Ala
260 265 270

Gly Val Lys Val Asp Tyr Glu Ser Val Pro Asp Ala Ser His Met Met
275 280 285

His Gln Ser Asp Pro Ala Arg Tyr Ala Glu Ile Leu Thr Pro Trp Ala
290 295 300

Ala Ala Leu Ala Pro
305

<210> 6
<211> 309
<212> PRT
<213> Streptomyces coelicoflavus

<400> 6

Met Val Thr Ser Pro Ala Leu Arg Asp Val His Val Pro His Ala Tyr
1 5 10 15

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

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

Gly Ser Trp Trp Ser Tyr Glu Glu Ala Met Gly Leu Leu Ser Glu His
50 55 60

Phe His Val Tyr Ala Val Asp Leu Arg Gly Gln Gly Arg Ser Ser Trp
Page 7

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

<210> 7
 <211> 300
 <212> PRT
 <213> Rhodococcus triatome

Sequence listing

<400> 7

Met Pro His Asp Tyr Glu Glu Lys Leu Val Asp Leu Gly Glu Ile Asp
1 5 10 15

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

Ile Pro Ser Gln Ser Glu Ser Trp Trp Gly Tyr Glu Glu Ala Met Gly
35 40 45

Leu Leu Ala Glu Asp Tyr His Val Phe Ala Val Asp Met Arg Gly Gln
50 55 60

Gly Arg Ser Thr Trp Thr Pro Gly Arg Tyr Ser Leu Asp Asn Phe Gly
65 70 75 80

Asn Asp Leu Val Arg Phe Ile Asp Leu Val Ile Gly Arg Thr Val Ile
85 90 95

Val Ser Gly Asn Ser Ser Gly Gly Val Val Ala Ala Trp Leu Ala Ala
100 105 110

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

Phe Phe Ala Ser Glu Leu Asp Pro Lys Val Gly His Thr Ile Arg Gln
130 135 140

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

Trp Ser Val Gly Asp Tyr Ala Gly Phe Leu Lys Ala Met Lys Ser Ser
165 170 175

Glu Val Pro Met Leu Arg Gln Val Pro Leu Pro Glu Thr Ala Pro Gln
180 185 190

Asn Leu Leu Glu Tyr Asp Pro Glu Trp Ala Arg Ala Phe Tyr Glu Gly
195 200 205

Thr Val Ala Gln Thr Cys Pro His Asp Tyr Met Leu Ser Gln Val Lys
210 215 220

Val Pro Met Leu Val Thr His His Ala Arg Met Ile Asp Glu Ala Thr
225 230 235 240

Ser Gly Leu Val Gly Ala Met Ser Asp Leu Gln Val Gln Lys Ala Ala
245 250 255

Glu Ile Ile Arg Gly Thr Gly Val Gln Val Asp Val Val Asp Leu Pro
260 265 270

Sequence listing

Glu Ala Pro His Ile Leu His Gln Leu Ala Pro Lys Glu Tyr Val Glu
275 280 285

Ile Leu Asn Asn Trp Val Glu Lys Leu Pro Pro Val
290 295 300

<210> 8

<211> 307

<212> PRT

<213> Hirschia baltica

<400> 8

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

Val Asp Leu Gly Glu Ile Lys Met Asn Tyr Ile Val Ala Gly Ala Asp
20 25 30

Val Ser Pro Ala Leu Leu Leu Ile Pro Gly Gln Thr Glu Ser Trp Trp
35 40 45

Gly Phe Glu Ala Ala Ile Glu Lys Leu Glu Ser Asn Phe Gln Val Phe
50 55 60

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

Tyr Ser Leu Asn Leu Met Gly Asn Asp Leu Val Arg Phe Ile Ser Leu
85 90 95

Val Ile Lys Arg Pro Val Ile Val Ser Gly Asn Ser Ser Gly Gly Leu
100 105 110

Leu Ala Ala Trp Leu Ser Ala Tyr Ala Met Pro Asn Gln Ile Arg Ala
115 120 125

Ile His Cys Glu Asp Ala Pro Phe Phe Thr Ala Glu Lys Ala Pro Leu
130 135 140

Tyr Gly His Ala Ile Gln Gln Ala Ala Gly Pro Ile Phe Ser Leu Met
145 150 155 160

Ser Lys Phe Leu Gly Asp Gln Trp Ser Ile Asn Asn Trp Glu Gly Leu
165 170 175

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

Gln Val Glu Gln Pro Pro Gln His Leu Lys Glu Tyr Asp Pro Glu Trp
195 200 205

Sequence listing

Gly Arg Ala Phe Ile Glu Gly Lys Phe Asn Leu Asn Ser Pro His His
210 215 220

Thr Leu Leu Ser Asp Ile Lys Thr Pro Met Leu Tyr Thr His His Met
225 230 235 240

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

Phe Gln Ala Ser Lys Ile Lys Glu Ile Ala Leu Lys Thr Gly Asn Ser
260 265 270

Phe Glu Leu Ile Asp Ala Pro Asp Ala Phe His Ser Met His Glu Ala
275 280 285

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

Asn Leu Gln
305

<210> 9
<211> 321
<212> PRT
<213> Nocardia brasiliensis

<400> 9

Met Gly Ile Ser Glu Ala Ala Asp Arg Ala Asp Thr Phe Val Ala His
1 5 10 15

Lys Phe Glu Glu Gln Leu Val Asp Leu Gly Glu Ile Arg Met Asn Tyr
20 25 30

Val Ala Ala Gly Asp Pro Thr Ser Pro Ala Leu Leu Leu Ile Pro Ala
35 40 45

Gln Gly Glu Ser Trp Trp Gly Tyr Glu Asn Ala Ile Thr Leu Leu Ala
50 55 60

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

Thr Trp Thr Pro Gly Arg Tyr Asn Leu Asn Thr Trp Gly Asn Asp Val
85 90 95

Glu Arg Phe Ile Asp Leu Val Ile Gly Arg Pro Thr Leu Val Ala Gly
100 105 110

Asn Ser Ser Gly Gly Val Ile Ala Ala Trp Leu Ala Ala Tyr Ala Lys
115 120 125

Sequence listing

Pro Gly Gln Ile Arg Gly Ala Met Leu Glu Asp Pro Pro Leu Phe Ala
130 135 140

Ser Gln Ala Ala Pro Pro Tyr Gly Pro Gly Ile Met Gln Thr Leu Gly
145 150 155 160

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

Gly Asp Trp Asp Gly Met Val Ala Ala Ala Pro Arg Glu Leu Pro Glu
180 185 190

Phe Leu His Pro Gly Ile Ala Phe Leu Phe Gly Asp Gly Thr Gly Glu
195 200 205

Gly Ala Ala Ala Thr Pro Pro Gln His Leu Lys Glu Tyr Asp Pro Glu
210 215 220

Trp Ala Gln Ala Trp Ala Thr Asp Val Ala Asn Ala Gly Cys Asp His
225 230 235 240

Ala Thr Met Leu Ala Gln Asn Arg Val Pro Val Leu Leu Thr His His
245 250 255

Phe His Leu Thr Asp Pro Asp Thr Gly Gln Leu Met Gly Ala Met Thr
260 265 270

Asp Ile Gln Ala Gln Gln Ala Arg Arg Leu Leu Ala Ala Thr Gly Gln
275 280 285

Pro Val Thr Phe Thr Ala Leu Asp Ala Pro His Thr Met His Asp Pro
290 295 300

Glu Pro Glu Arg Tyr Phe Glu Val Leu Thr Glu Trp Ala Ser Ala Leu
305 310 315 320

Asp

<210> 10
<211> 319
<212> PRT
<213> Mycobacterium vaccae

<400> 10

Met Gly Arg Tyr Ala Gly Val Phe Gly Pro His Ala Pro Glu Ser Thr
1 5 10 15

Tyr Val Gly His Ala Tyr Pro Glu Gln Leu Phe Asp Thr Gly Glu Val
20 25 30

Arg Leu Asn Tyr Ala Val Ala Gly Asp Ala Ser Ala Ser Pro Leu Leu

Sequence listing

35

40

45

Leu Ile Pro Gly Gln Thr Glu Ser Trp Trp Gly Tyr Glu Pro Ala Met
50 55 60

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

Gln Gly Arg Ser Thr Arg Thr Pro Arg Arg Tyr Thr Leu Asp Asn Ile
85 90 95

Gly Asn Asp Leu Val Arg Phe Leu Asp Gly Val Ile Gly Arg Pro Ala
100 105 110

Phe Val Ser Gly Leu Ser Ser Gly Gly Leu Leu Ser Ala Trp Leu Ser
115 120 125

Ala Phe Ala Glu Pro Gly Gln Val Leu Ala Ala Cys Tyr Glu Asp Pro
130 135 140

Pro Phe Phe Ser Ser Glu Leu Asp Pro Val Ile Gly Pro Gly Leu Met
145 150 155 160

Ser Thr Val Gly Pro Leu Phe Ala Leu Tyr Val Lys Tyr Leu Gly Asp
165 170 175

Gln Trp Ser Ile Gly Asp Trp Asp Gly Phe Val Ala Gly Ala Pro Gln
180 185 190

Glu Leu Ala Gly Trp Gln Ala His Val Ala Leu Ala Gly Gly Thr Ala
195 200 205

Glu Pro Pro Gln His Leu Lys Glu Tyr Asp Pro Glu Trp Gly Arg Ala
210 215 220

Phe Val Gly Gly Thr Phe Thr Thr Gly Cys Pro His Gln Val Met Leu
225 230 235 240

Ser Gln Val Lys Val Pro Val Leu Phe Thr His His Phe Arg Met Leu
245 250 255

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

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

Arg Ser Phe Pro Met Met Gly His Ser Met His Ala Gln Asp Pro Ala
290 295 300

Leu Phe Ala Gly Thr Leu Val Asp Trp Phe Thr Ala Ala Arg Ser

Sequence listing
315

305

310

<210> 11
<211> 319
<212> PRT
<213> Mycobacterium gilvum

<400> 11

Met Gly Arg Tyr Ala Gly Val Phe Gly Pro His Ala Pro Glu Ala Thr
1 5 10 15

Tyr Val Glu His Gly Tyr Pro Glu Arg Leu Phe Asp Thr Gly Glu Val
20 25 30

Gln Leu Asn Tyr Val Val Ala Gly Asp Ala Ala Ala Pro Pro Leu Leu
35 40 45

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

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

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

Gly Asn Asp Leu Val Arg Phe Leu Asp Gly Val Ile Gly Arg Pro Ala
100 105 110

Phe Val Ser Gly Leu Ser Ser Gly Gly Leu Ala Ser Ala Trp Leu Ser
115 120 125

Ala Phe Ala Lys Pro Gly Gln Val Val Ala Ala Cys Trp Glu Asp Pro
130 135 140

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

Asp Ser Ile Gly Pro Leu Phe Gly Met Trp Ala Arg Tyr Leu Gly Asp
165 170 175

Gln Trp Ser Val Gly Asp Trp Asp Gly Phe Val Ala Ala Val Pro Thr
180 185 190

Glu Leu Ala Asp Trp Gln Ala His Val Ala Leu Val Val Gly Thr Ala
195 200 205

Asp Pro Pro Gln Asn Leu Arg Glu Tyr Asp Pro Glu Trp Gly Lys Ala
210 215 220

Phe Ile Thr Gly Thr Phe Ala Ala Ser Cys Pro His His Val Met Leu
225 230 235 240

Sequence listing

Ser Lys Val Lys Val Pro Val Leu Tyr Thr His His Phe Arg Met Ile
245 250 255

Asp Glu Gly Ser Gly Gly Leu Ile Gly Ala Cys Ser Asp Ile Gln Ala
260 265 270

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

Arg Ser Phe Pro Met Met Ala His Ser Met His Gly Gln Asp Pro Ala
290 295 300

Leu Phe Ser Glu Thr Leu Val Glu Trp Phe Ser Arg Phe Thr Gly
305 310 315

<210> 12
<211> 322
<212> PRT
<213> Gordonia effusa

<400> 12

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

Asp Phe Lys Glu Asn Ile Val Asp Leu Gly Glu Ile Arg Met Asn Tyr
20 25 30

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

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

Lys His Phe Gln Val Phe Ala Ile Asp Leu Arg Gly Gln Gly Arg Thr
65 70 75 80

Thr Trp Thr Pro Gly Arg Tyr Thr Leu Asp Ile Phe Gly Asn Asp Val
85 90 95

Val Arg Phe Ile Asp Leu Val Ile Gly Arg Glu Thr Leu Ile Ala Gly
100 105 110

Asn Ser Ser Gly Gly Leu Ile Gly Ala Trp Leu Ala Ala Phe Ala Lys
115 120 125

Pro Gly Gln Val Arg Ala Val Met Leu Glu Asp Pro Pro Leu Phe Ala
130 135 140

Ser Glu Ile Arg Pro Pro Tyr Gly Pro Gly Ile Trp Gln Gly Leu Gly
145 150 155 160

Sequence listing

Pro Met Phe Ala Ala Trp Ala Lys Trp Leu Gly Pro Gln Trp Ser Ile
165 170 175

Gly Asp Trp Asp Gly Met Val Lys Ala Leu Pro Asp Glu Leu Pro Glu
180 185 190

Asp Leu Leu Pro Gly Ile Gly Phe Met Leu Gly Asp Gly Glu Ser Asp
195 200 205

Gly Ala Ala Pro Thr Pro Pro Gln His Leu Lys Glu Tyr Asp Pro Glu
210 215 220

Trp Gly Ala Ser Trp Ala Ser Gly Phe Ala Asn Thr Gly Cys Glu His
225 230 235 240

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

Phe Arg Gln Ile Asn Glu Glu Thr Gly His Leu Met Gly Ala Leu Ser
260 265 270

Asp Leu Gln Ala Ala Gln Val Arg His Ile Ile Glu Glu Val Ala Gly
275 280 285

Gln Glu Val Thr Tyr Val Ser Leu Asp Ala Pro His Thr Met His Glu
290 295 300

Pro Gln Pro Glu Arg Tyr Thr Asp Val Leu Leu Asp Trp Val Lys Lys
305 310 315 320

Leu Gly

<210> 13
<211> 328
<212> PRT
<213> Togninia minima

<400> 13

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

Val Pro Gly Gln Ser Glu Ser Trp Trp Gly Tyr Glu Met Ala Met Trp
20 25 30

Leu Leu Lys Asp Asp Tyr Gln Val Phe Ala Val Asp Met Arg Gly Gln
35 40 45

Gly Gln Ser Thr Trp Thr Pro Gly Arg Tyr Ser Leu Asp Thr Phe Gly
50 55 60

Sequence listing

Asn 65 Asp Leu Val Lys 70 Phe 75 Ile Asp Ile Val Ile 75 Lys Arg Pro Val Val 80
 Val Ser Gly Leu 85 Ser 85 Ser Gly Gly Val Val 90 Ser Ala Trp Leu Ser 95 Ala
 Phe Ala Lys 100 Pro Gly Gln Ile Arg Ala 105 Ala Val Tyr Glu Asp 110 Pro Pro
 Leu Phe Ala 115 Ser Gln Ser Lys 120 Pro Ala Ile Gly Gln Ser 125 Val Met Gln
 Thr Val 130 Ala Gly Pro Phe 135 Phe Asn Leu Trp Tyr Lys 140 Trp Leu Gly Ala
 Gln 145 Trp Thr Ile Gly Asp 150 Gln Ala Gly Met Val 155 Ala Ala Met Pro Lys 160
 Glu Ile Pro Ala Trp 165 Ile Leu Gln Tyr Leu 170 Gly Asn Thr Thr Ser 175 Gly
 Pro Thr Gly Leu 180 Asp Leu Thr Leu Asn 185 Glu Tyr Asp Pro Glu 190 Trp Gly
 His Gly Phe 195 Val Ser Gly Thr Val 200 Asp Ala Thr Cys Asp 205 His Glu Ala
 Met Leu 210 Thr His Val Lys 215 Val Pro Val Leu Phe Thr 220 His His Ser Arg
 Ala Ile Asp Pro Tyr Thr 230 Gly Asn Leu Ile Gly 235 Ser Val Ser Asp Thr 240
 Gln Val Ser Tyr Ala 245 Gln Gly Leu Ile Thr 250 Thr Asn Gly Asn Gln Ser 255
 Phe Thr Leu Lys 260 Asn Phe Pro Leu Ala 265 Ser His Asp Met His 270 Asn Ser
 Asp Pro Ala 275 Thr Tyr Val Ser Ala 280 Ile Thr Thr Trp Met 285 Ala Ser Leu
 Gly Ile Gly Ser Ala Val Ile 295 Pro Gly Pro Val Lys 300 Val Ala Ser Ala
 Ser 305 Ala Gln Val Ser Ala 310 Ala Ser Thr Ala Pro 315 Pro Ser Cys Thr Ser 320
 Thr Ser Ala Pro Ser 325 Thr Gly His

Sequence listing

<210> 14
 <211> 280
 <212> PRT
 <213> Actinosynnema mirum

<400> 14

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

Val Asp Leu Gly Glu Val Val Leu Asn His Ala Glu Ala Gly Ser Pro
 20 25 30

Asp Arg Pro Ala Leu Val Pro Val Pro Glu Gln Gly Gly Ser Trp Trp
 35 40 45

Ser Tyr Glu Arg Val Met Pro Leu Pro Ala Arg Asp Phe His Val Phe
 50 55 60

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

Tyr Ser Leu Asp Asp Phe Gly Asn Asp Leu Val Arg Phe Leu Ala Leu
 85 90 95

Val Val Arg Arg Pro Ala Val Val Ala Gly Asn Ser Ser Gly Gly Val
 100 105 110

Leu Ala Ala Trp Ser Ser Ala Tyr Ala Met Pro Gly Gln Val Arg Ala
 115 120 125

Val Leu Leu Glu Asp Pro Pro Leu Phe Ser Ser Glu Leu Thr Pro Val
 130 135 140

Cys Gly Pro Gly Val Arg Gln Ala Ala Gly Pro Leu Phe Glu Leu Leu
 145 150 155 160

Ser Thr His Leu Gly Asp Gln Trp Gly Gly Gly Arg Pro Gly Arg Val
 165 170 175

His Gly Gly Val Pro Arg Leu Gly Leu Ala Ala Ala Ala Ala Val Arg
 180 185 190

Val Ala Arg Arg Ala Ala Ala Thr Asp Ala Arg Gly Arg Pro Gly Ala
 195 200 205

Ala Arg Gly Arg Pro Ala Gly Val Gly Gly Ala Ala Arg Arg Gly Arg
 210 215 220

Gly Gly Arg Glu Arg Thr Gly Thr Thr Thr Val Leu Ser Gly Leu Thr
 225 230 235 240

Gly Ser Arg Thr Ser Gly Thr Gly Arg Cys Arg Lys Pro Phe Arg Leu

Sequence listing

245

250

255

Arg Gln Trp Trp Ala Gly Gly Ala Arg Gly Pro Pro Pro Pro Arg Gln
260 265 270

Ile Arg Ala Asp Val Arg Thr Arg
275 280

<210> 15

<211> 326

<212> PRT

<213> Kutzneria albida

<400> 15

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

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

Ala Glu Ala Gly Thr Pro Asp Lys Pro Ala Leu Leu Leu Leu Pro Glu
35 40 45

Gln Thr Gly Ser Trp Trp Ser Tyr Glu Pro Ala Met Gly Leu Leu Ala
50 55 60

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

Thr Trp Thr Pro Gly Arg Tyr Ser Leu Asp Asn Phe Gly Asn Asp Leu
85 90 95

Val Arg Phe Ile Ala Leu Ala Ile Arg Arg Pro Val Val Val Ala Gly
100 105 110

Cys Ser Ser Gly Gly Val Leu Ala Ala Trp Leu Ser Ala Tyr Ala Leu
115 120 125

Pro Gly Gln Ile Arg Gly Ala Leu Cys Glu Asp Ala Pro Leu Phe Ala
130 135 140

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

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

Gly Asp Trp Ala Gly Leu Val Ala Ala Ala Gln Ala Ser Pro Ala Lys
180 185 190

Met Met Ser Leu Phe Lys Met Pro Gly Glu Pro Pro Gln Asn Leu Arg
195 200 205

Sequence listing

Glu Tyr Asp Pro Glu Trp Ala Arg Val Phe Phe Glu Gly Thr Val Gly
210 215 220

Leu His Cys Pro His Asp Arg Met Leu Ser Gln Val Lys Thr Pro Val
225 230 235 240

Leu Ile Thr His His Ala Arg Thr Thr Asp Pro Glu Thr Gly Glu Phe
245 250 255

Leu Gly Ala Leu Ser Glu Leu Gln Ala Glu Arg Ala Gln Ala Ile Ile
260 265 270

Arg Ala Ala Gly Val Pro Val Asp Tyr Gln Ser Phe Pro Asp Ala Ala
275 280 285

His Ala Met His Thr Thr Glu Pro Ala Arg Tyr Ala Ala Val Leu Thr
290 295 300

Ala Trp Ala Ala Lys Leu Pro Pro Val Ala Asp Thr Ser Pro Ser Ala
305 310 315 320

Ala Ala Ser Ala His Val
325

<210> 16
<211> 987
<212> DNA
<213> Rhodococcus erythropolis

<220>
<221> misc_feature
<223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 1

<400> 16
atggccgaag aaggaactag gtccgaagca gcggatgctg ccacacaagc gagacagcta 60
cccgatctcg ggaacatctt tgtctcgcac cgatttccgg aaaggcagggt cgatctcgggt 120
gaagtgggtga tgaacttcgc ggaggcgggc tctccggaca acccggcact gtcctcctc 180
cccgagcaga ccgggtcgtg gtggagttac gagccagtga tgggtcttct ggagagaaac 240
tttcatgtct ttgccgtcga tatccgtggg caaggctcga gtacctggac gccacggcga 300
tacagcctgg acaacttcgc caatgatctg gtgcgtttca tcgctctggt catcaagcgc 360
cctgtcgtcg tggcagggaa ctctcggggg gggctgctgg ccgcctggct ctccggctac 420
gcgatgcccg gccagatccg tgcagcattg tgtgaggacg caccgttctt tgcgtcggag 480
ttggtccccg catacgggtca ctcggttctg caggcggcgg gtccggcatt cgagttgtac 540
cgggacttcc tcggggacca gtgggtcgatt ggggactgga aagggttcgt tgaggcagcc 600
aaagcgtcgc cggcaaaggc tatgcaatta tttccgaccc cggatgaggc gccgcagaat 660
ctcaaggaat acgacccgga atgggggctg gcattcttcg aagggtactgt ggcactgcac 720

Sequence listing

780 tgcaccacag acagatgtct ctgcgaagtc aagacaccaa ttctcatcac tcaccacgcg
840 cggacgatcg accccgagac gggcgagctg ttggcgcgct tctccgacct tcaggcagag
900 catgcgcagg acatcatcgg gtctgcgggc gticgggtgg actatcagtc gcaaccggac
960 gcgcttcaca tgatgcacct gticgatccc gctcgttacg cggagatctt gacatccctg
987 tccgcaacac tgccttcgaa cgactag

<210> 17
<211> 987
<212> DNA
<213> Artificial sequence
<220>
<223> ORF was codon optimized and thus difference from natural occurring DNA sequence.

<400> 17

60 atgacagag aaggcaccg tagcgaagca gcagatgcag caaccaggc acgtcagctg
120 ccgatagcc gtaacatttt tgttagccat cgtttccgg aacgtcaggt tgatcttggt
180 gaagtgttta tgaatttgc agaagcaggt agtcgggata atccggcat actgctgctg
240 ccggaacaga ccggtagttg gtgtcttat gaaccggtta tgggtctgct ggcagaaaaa
300 ttctatgttt ttgcagttga tattcgttgt cagggtcgtg gcaacctggac accgcgtcgt
360 tatagcctcg ataatttgg taatgatctg gtgcgttta ttgcccttgt tataaacgt
420 ccggttgttg ttgcaggtaa tagcagcggt ggcctgctgg ctgcattgct gagcgccctat
480 gcaatgcctg gtcagatcgg tcagacactg tgtgaagatg cacggtttt tcgaagcgaa
540 ctgttctctg cctatgttca tagcgttctg caggcagcag gtccggcat tgaactgtat
600 cgtgatcttc tgggtgatca gtgttcaatt ggtgatggaa aagttttgt tgaagcagca
660 aagcgaagtc cggctaagc aatgcagctg ttccgacac cggatgaagc accgcagaat
720 ctgaaagaat atgatccgga atgggtcgt gcatitttg aagcacaccg tgcactgcat
780 tgtccgcgat atcgtatgct gagccagggt aaaaaccgga ttctgatcac ccatcatgca
840 cgtaccatcg atccggaac cgttgaactg ctgggtgcac tgagtgatct gcaggccgaa
900 catgcacagg atatatcgg tagtccggt gticgtgttg atatcagag ccatcctgat
960 gcactgcaca tgatgcacct gttgatccg gcacgttatg cagaattct gaccagttgg
987 agcgcaaccc tgccttcgaaa tgattaa

<210> 18
<211> 927
<212> DNA
<213> Artificial sequence
<220>
<223> ORF was codon optimized and thus difference from natural occurring DNA sequence.

Sequence listing

<221> misc_feature

<223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 2

<400> 18

```
atggcagatc cggcacagcg tgatgtttat gttccgcatg catatccgga aaaacaggca      60
gatctgggtg aaattacat gaattatgcc gaagccggtg aacctgatat gcctgcagtt      120
ctgctgattc cggaacagac cggtagttgg tggggttatg aagaagcaat gggctctgctg      180
gcagaaaact ttcattgttta tgcagttgat ctgcgtggtc agggctcgtag cagctgggca      240
ccgaaacggt atagcctgga taattttggt aatgatctgg tgcgttttat tgccctgggt      300
gttaaacgct cggttattgt tgcaggtaat agcagcgggt gtgttctggc agcatggctg      360
agcgcatata gcatgcctgg tcaggttcgt ggtgcactgt gtgaagatgc accgtttttt      420
gcaagcgaac tggttaccac ctgtgggtcat agcattcgtc aggcagcagg tccgatgttt      480
gaactgtttc gtacctatct gggcgatcag tggtcagttg gtgattggac cggctattgt      540
cgtgcagcag atgcaagcag cagcccgatg gcacgttatt ttgttgaga tgaaattccg      600
cagcacatgc gtgaatatga tccggaatgg gcacgtgcat tttgggaagg caccgttgca      660
ctgcattgtc cgcattgaaca gctgctgacc cagggttaaaa caccggtgct gctgacacat      720
cacatgcgcg atattgatcc tgataccggt catctgggtg gtgccctgag tgatgaacag      780
gcagcccgtg cacgtctgct gatggaaagt gccgggtgta aagttgatta tgcaagcgtt      840
ccggatgcac tgcacatgat gcaccagttt gatccgcctc gttatgttga aatctttacc      900
cagtgggcag caaccctggc agcataa      927
```

<210> 19

<211> 930

<212> DNA

<213> Artificial sequence

<220>

<223> ORF was codon optimized and thus difference from natural occurring DNA sequence.

<220>

<221> misc_feature

<223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 3

<400> 19

```
atggttacca gtccggcact gcgtgatgtt catgttccgc atgcatatcc ggaacagcag      60
gttgatctgg gtgaaattac catgaattat gccgaagccg gtgatccggg tcgtccggca      120
gttctgctga tcccgaaca gaccggtagt tgggtgtctt atgaagaagc aatgggtctg      180
ctggcagaac attttcatgt ttatgcagtt gatctgcgtg gtcagggctg tagcagctgg      240
accccgaac gttatagcct ggataatttt ggtaatgata tgggtgcgttt tattgccctg      300
gttgttcgtc gtccggttgt tgttgcaggt aatagcagcg gtggtgttct ggcagcatgg      360
ctgagcgcat atagcatgcc tggtcagatt cgtggtgtgc tgtgtgaaga tccgcctttt      420
tttgcaagcg aactggttcc ggcacatggt catagcgttc gtcaggggtg aggtccgggt      480
```

Sequence listing

540 tttgaactgt ttcgtacctta tctggcgcat cagtggctcag ttggtgattg ggaaggtttt

600 cgtagcgcaag cagatgccaag cgcaagcccg atggcacgta gctttgttc agataccatt

660 ccgcagcatc tgaagaataa tgcaccgaa tgggcacgtg catttataa aggcaccgtt

720 ggctcgaatt gtcgcgcatga acgtatgctg aatcgtgta ataccaccgt gctcgtgacc

780 catcacatgc gtggcaccca tccgaaacc gtaatactgc tgggtgcact gagtgatgaa

840 caggcagcac aggtgcgtcg tctgatgaa agtgcgggtg ttaagttga ttatgaagc

900 gttcgggatg caagcccatat gatgcaccag agcatccgg cagttatgc agaatcttcg

930 accctgtga ccgcagcact ggaccgtaa

<210> 20
 <211> 930
 <212> DNA
 <213> Artificial sequence

<220> ORF was codon optimized and thus difference from natural occurring DNA sequence.

<220> misc-feature
 <221> Artificial DNA
 <223> sequence encodes polypeptid with SEQ ID NO: 4

<400> 20

60 atgtttacca gtcggcact gcgtgatgt catgttcgc atgcataacc ggaacagcag

120 gtgatctgg gtgaattac catgaattat gccgaagccg gtgatactga tgcaccgca

180 gttcctgta tcccggaaca gaccgtagt tgggtgcat atgaagaagc aatgggtctg

240 ctgcagaac atttccatgt ttatgcagt gatcctgctg gtcagggtcg tagcagctgg

300 acccgaaac gtatagcct gataattt gtaatgac tgggtcgctt tattgcccctg

360 gttgttaaac gtcgggttgt tgttcaggt aatagcagc gttgtgtct ggacagcatgg

420 ctgagcgcat atagcatgcc tgttcagct cgtgtgtgc tgtgtgaaga tccgcccttt

480 ttgcgaagcg aactgttcc ggcacatgt catagcgtc gtcagggtgc aggtccggtt

540 ttgaactgt ttcgtacctta tctggcgcat cagtggctcag ttagcgattg ggaaggtttt

600 tgtcgtgcaag ccgtgccaag cgcaagcccg atggcacgta gctttgttc agatggtatt

660 ccgcagcatc tgaagaataa tgcaccgaa tgggcacgtg catttataa aggcaccgtt

720 ggctcgaatt gtcgcgcatga acgtatgctg ggtcgtgta ataccaccgt gctcgtgacc

780 catcacatgc gtggcaccca tccgaaacc gtaatactgc tgggtgcact gagtgatgaa

840 caggcagcac aggtgcgtcg tctgatgaa agtgcgggtg ttaagttga ttatgaagc

900 gttcgggatg caagcccatat gatgcaccag agcatccgg cagttatgc agaatcttc

930 accctgtgg cagcagccct ggaccgtaa

<210> 21
 <211> 930
 <212> DNA

Sequence listing

<213> Artificial sequence

<220>

<223> ORF was codon optimized and thus difference from natural occurring DNA sequence.

<220>

<221> misc_feature

<223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 5

<400> 21

```
atggttacca gtccggcact gcgtgatggt catgttccgc atgcatatcc ggaacagcag      60
gttgatctgg gtgaaattac catgaattat gccgaagccg gtgatccggg tcgtccggca     120
gttctgctga tcccggaaca gaccggtagt tgggtggtctt atgaagaagc aatgggtctg     180
ctggcagaac attttcatgt ttatgcagtt gatctgcgtg gtcaggggtc tagcagctgg     240
accccgaaac gttatagcct ggataatttt ggtaatgata tgggtgcgttt tatggcactg     300
gttggttcgtc gtccgggttg tgttgacagg aatagcagcg gtggtgttct ggcagcatgg     360
ctgagcgcac atagcatgcc tggtcagatt cgtggtgtgc tgtgtgaaga tccgcctttt     420
tttgcaagcg aactggttcc ggcacatggt catagcggtc gtcaggggtc aggtccgggt     480
tttgaactgt ttcgtacctt tctgggcatc cagtgggtcag ttggtgattg ggaagggttt     540
cgtagcgcag ccggtgcaag cgcaagcccg atggcacgta gctttgttgc agataccatt     600
ccgcagcatc tgaaagaata tgatccggaa tgggcacgtg cattttatga aggcaccgtt     660
ggtctgaatt gtccgcatga acgtatgctg aatcgtgtta atacaccggt gctgctgacc     720
catcacatgc gtggcaccga tccggaacc ggtaatctgc tgggtgcact gagtgatgaa     780
caggcagcac aggcacgtcg tctgatggaa agtgccggtg ttaaagttga ttatgaaagc     840
gttccggatg caagccacat gatgcaccag agcgatccgg cacgttatgc agaaattctg     900
accccggtgg cagcagccct ggcaccgtaa                                     930
```

<210> 22

<211> 930

<212> DNA

<213> Artificial sequence

<220>

<223> ORF was codon optimized and thus difference from natural occurring DNA sequence.

<220>

<221> misc_feature

<223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 6

<400> 22

```
atggttacca gtccggcact gcgtgatggt catgttccgc atgcatatcc ggaacagcag      60
gttgatctgg gtgaaattac catgaattat gccgaagccg gtgatcctga tcgtccggca     120
gttctgctga tcccggaaca gaccggtagt tgggtggtctt atgaagaagc aatgggtctg     180
ctgagcgaac attttcatgt ttatgcagtt gatctgcgtg gtcaggggtc tagcagctgg     240
```

Sequence listing

300 acccggaac gtatagcct gataattt gtaattgctt tatggccctg
360 gttgttaac gtccggtgt tgttcaggt aatagcagcg gtgtgttct ggacgcatgg
420 ctgagcgcat atagcatgcc tggtcagcty cgtgtgtgc tgtgtgaaga tccgcccttt
480 ttgcgaagcg aactgttcc ggacatggt catagcgttc gtcagggtgc aggtccggtt
540 ttgaactgt ttcttaacta tctggcgcat cagtgtcag ttgtgtatg ggaagtttt
600 tgtcgtgcag ccgttgcaag cgaagcccg atggcagta gcttgttc agatgttat
660 ccgagcatc tgcaagaata tgatccgga tgggcagctg tttttatga aggcaccgtt
720 gttctgagct gtccgcatga acgtatgcty ggtcaggtta aaacaccgtt gctcgtgacc
780 catcatatgc gtgtatcga tccggaacc ggtaatctgc tgggtgcact gagtatgaa
840 caggccctgc gtgcagctcy tctgatggat agtgcgctg ttaacgttga ttatgaagc
900 gtccgcatg caagccacat gatgccaa aggcaccgg cagttatgt tgaatcttt
930 accgttggg cagcagccct ggacccgtaa

<210> 23

<211> 903

<212> DNA

<213> Artificial sequence

<220>

<223>

ORF was codon optimized and thus difference from natural occurring DNA sequence.

<220>

<221> misc-feature

<223>

Artificial DNA sequence encodes polypeptid with SEQ ID NO: 7

<400> 23

atgccgacg attatgaaga aaaactggt gatctggcg aaatcgact gaattatgca
60 gaagcaggtat gtccggataa accggcaty ctgctgatic cgaagccagag cgaaggttg
120 tgggctatg aagaagcaat ggtcctgcty gccgaagat atcatgtttt tgcagttgat
180 atgcgtgttc aggtcgtag cacctgaca ccggtcgtt atagccctga taattttggt
240 aatgatcttg tgcgcttat cgatectggt attggtcgtc cgttatgt tagcggtaat
300 agcagcggtg gtgtgttgc agcatgcty gcagcatita gccctgcctg tcaagttcgt
360 gcagcactgg cagaagatgc accgttttt gcaagcgaa tggaaccgaa agtgggtcat
420 accattcgtc agcagcagag tcatatttt gttaactgyc gtgatattct ggtgatcag
480 tgttcagttg gtgatatgc agtttcty aaagcaatga aaagcagcga agttccgaty
540 ctgcgtcaggt ttccgctgcc ggaaccgca ccgcagaatc tgcctggaata tgatccgga
600 tgggcagctg catttatga aggcaccgtt gcacagacct gtccgcatga ttatatgcty
660 tggcaggtta aagtcccat gctgttaccc catcatgcac gtatgatitga tgaagcaacc
720 agcgtcttg ttgttgcaat gagcgtatcy caggttcaga aagcagcaga aattattcgt
780 ggacccggtt ttcaggttga tgttgttga tctgctgag caccgcatat tctgcatacag
840

Sequence listing

ctggcaccga aagaatatgt ggaaattctg aataactggg tggaaaaact gcctccggtt	900
taa	903

<210> 24
 <211> 924
 <212> DNA
 <213> Artificial sequence

<220>
 <223> ORF was codon optimized and thus differce from natural occuring DNA sequence.

<220>
 <221> misc_feature
 <223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 8

<400> 24 atgatccaga acaataaaac cgcaccgtat aaatacaaag aaaaactggt tgatctgggc	60
gaaatcaaaa tgaactatat tgttgccggt gcagatgtta gtccggcact gctgctgatt	120
ccgggtcaga ccgaaagttg gtgggggtttt gaagcagcaa ttgagaaaact ggaaagcaac	180
tttcaggtgt ttgcaattga tctgcgtggt cagggtaaaa gcaccagac accgggtcgt	240
tatagcctga atctgatggg taatgatctg gttcgtttta ttagcctggt tattaacgt	300
ccggttattg ttagcggtaa tagcagcggg ggtctgctgg cagcatggct gagcgcctat	360
gcaatgccga atcagattcg tgcaattcat tgtgaagatg caccgttttt taccgcagaa	420
aaagcaccgc tgtatgggtca tgcaattcag caggcagcag gtccgatttt tagcctgatg	480
agcaaatttc tgggtgatca gtggtcaatt aacaattggg aagggtctgaa agcagcacag	540
gcaaaagata cccatccggc aaacaaaatg attagccagg ttgaacagcc tccgcagcat	600
ctgaaagaat atgatccgga atgggggtcgt gcattttattg aaggcaaatt taacctgaac	660
agtccgcatt ataccctgct gagcgacatt aaaaccccga tgctgtatac ccatcacatg	720
cgttttgaag atccgcagac aggtctgctg attggtgcaa ccagcgattt tcaggcaagc	780
aaaatcaaag aaattgccct gaaaaccggc aatagcttcg aactgattga tgcaccggat	840
gcatttcata gtatgcatga agccgatccg cagcgttttg ttgatattct gaccagctgg	900
attgaacgtc tgaatctgca gtaa	924

<210> 25
 <211> 966
 <212> DNA
 <213> Artificial sequence

<220>
 <223> ORF was codon optimized and thus differce from natural occuring DNA sequence.

<220>
 <221> misc_feature
 <223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 9

<400> 25

Sequence listing

60 atggtatata gcgaagcagc agatcgtgca gatacccttg ttgcacataa atttgaagaa
 120 cagctggttg atctgggtga aattcgtatg aattatgttg cagccgggtga tccgaaccagt
 180 ccggcactgc tgcgtgatcc ggcaaggggt gaaagtgtgt ggggttatga aaatgcaatt
 240 accctgctgg caaatgatatt tcgtgttttt gcaattgatac tgcgtgtgca gggctcgtagc
 300 accctggacac cgggtcgtta taatctgaat acctggggta atgatgtga acccttatatt
 360 gatctggtta ttgctcgtcc gacctgtgtt gcaggtaata gcagcgggtg tgttatgtga
 420 gcatgctgag cagccctatgc aaaaaccgggt cagattcgtg gtgcaaatgtc ggaagatccg
 480 cctctgtttg caagccaggc agcaaccgct tatgtccgg gtatatgca gacctgtggt
 540 ccgatatttg ttctgtgggc aaaaatggctg ggtccggcagt ggtcaggttg tgaattggat
 600 ggtatggttg cagcggcacc gcgtgaactg ccggaatttc tgcataccgg tatcgcatatt
 660 ctgtttgttg atggcaccgg tgaaggtgca gcagcaacccc ctccgcagca tctgaaagaa
 720 tatgatccgg aatgggcaca ggcattggca accgatgttg caaatgcagg ttgtgatcat
 780 gcaaaccatgc tggcacagaa tcgtgttcgg gtctctgctga cccatcatatt tcatctgacc
 840 gatccggata caggccagct gatgggtgca atgaccgata ttcaggcaca gcaggcagct
 900 cgtcgtcgtg cagcaaccgg tcagccggtt accttaaccg cactggatgc accgcatacc
 960 atgcatgatac ctgaaccctga accttatatt gaagtctga ccgaatgggc aagtgcactg
 gatata

<210>
 <211> 960
 <212> DNA
 <213> Artificial sequence

<220> ORF was codon optimized and thus difference from natural occurring DNA sequence.

<221> misc-feature
 <223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 10

<400> 26
 atgggtcgtt atgcgggtg ttttggtccg catgcaccgg aaagcacccta tgttggtcat
 60 gcatatccgg aacaactgtt tgataccggg gaagtctgct tgaattatgc agttgcccgtt
 120 gatgcaagcg caagtccgct gctgctgatat ccgggtcaga ccgaaagtg gtgggggttat
 180 gaaaccggcaa tgggtcgtct ggcaagaacat ttctcatgttc atgcagtga tctgctgtgt
 240 cagggtcgtta gcaaccggtac accgctgctgt tataccctgg ataataatgg taatgatctg
 300 gtgcgttttc tggatgtgtt tattgtcgtt ccggcatttg ttagcgtgtc gagcagcgggt
 360 gtctcgtga gcgcattggt gagcgccttt gcagaaccgg gtcaaggtctt ggcaagcatgt
 420 tatgaagatc cgcctttttt tagcagcgaa ctggaaccgg tgattgtccc ggtcttgatg
 480 agcacccgtg gtcgcgtgtt tgcaactgtat gttaaataac tgggttgatca gtgtccaatt
 540

<210> 28
 <211> 969
 <212> DNA
 <213> Artificial sequence
 caagatccgg cactgttttag cgaaccctg gttgaatggt ttagccggtt tacccggttaa
 tcaagtgtgc gtagcggttac ctatcgtagc ttccgatga tggcatatag catgcatggt
 ggtgtctga ttgtgtcagc tagcgatatc caggcaggtc ggtttaacca gctggcaaaa
 agcaagtta aagttccggt tctgtatacc catcaattc gcatgatga tgaaggtagt
 tgggttaag cattatatac cggcaacctt gcagcaagct gtccgcatac tgttatgctg
 gttgcactgg ttgttggcac cgcagatcct ccgagaatc tgcgtgaata tgatccggaa
 ggtgattggg atgttttgg ttccgaggtt ccgaaccgaac tggcagattg gcaggcacat
 gatagcattg gtccgctgtt tggtagtgg gcaggttacc tgggtgatca gttgtcagtt
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 ggtctggcaa gcgcattggt gagcgcatct gcaaaaaccg gtcaaggttgg tgcagcatgt
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 cagggtctga gcaaccgtac accggtcgc tataccctgg ataattgtg taatgatctg
 gaagcagcaa ttccgctgct ggacgtcat ttcatgttc atgcagttga tctgctgtgt
 gatgcagcag caccgcctct gctgctgatt ccggtcaga gcgaaagtgg gttgggttat
 gttatccgg aagctctgtt tgataccggt gaagtgcagc tgaattatgt tgttgcggt
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 <400> 27
 Artificial DNA sequence encodes polypeptid with SEQ ID NO: 11
 misc-feature
 <220>
 <221>
 <223>
 ORF was codon optimized and thus difference from natural occurring
 DNA sequence.
 <210> 27
 <211> 960
 <212> DNA
 <213> Artificial sequence
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 aatagtgtg caccgtgac ctatcgtagc ttccgatga tgggtcatag tatgcatgca
 gtagcctga ttgtgtcagc aaccgatgat caggcagcac ggtttgtga actgtttgaa
 agcaggtta aagttccggt tctgttacc catcaattc gtagcctgga tgaatgaagc
 tgggtcgtg cattgttgg ttggcaacctt accaaccggt gtccgcatac ggttatgctg
 gttgcactgg caggcgttac agcagaaccg cctcagcatc tgaagaataa tgatccggaa
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 Sequence listing

Sequence Listing

<220>
 <223> ORF was codon optimized and thus differce from natural occuring DNA sequence.

<220>
 <221> misc_feature
 <223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 12

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<400> 28
atgccgaaaa gcgaagcagc agatcgtgca gatagctttg ttagccatga tttcaaagaa      60
aacattgtgg atctgggcga aatccgcatg aattatgttg ttcagggcaa caaaaaaagt      120
ccggcactgc tgctgattcc ggcacagggg gaaagttggt ggggttatga agcagcaatt      180
ccgctgctgg caaaacattt tcaggttttt gcaattgata tgcgtggtca gggtcgtacc      240
acctggacac cgggtcgtta taccctggat attttttgta atgatgtggt gcgctttatc      300
gatctgggta ttggctgcta aaccctgatt gcaggtaata gcagcgggtg tctgattggt      360
gcatggctgg cagcatttgc aaaaccgggt cagggttcgt cagttatgct ggaagatccg      420
cctctgtttg caagcgaaat tcgtccgcct tatgggtccg gtatttgga gggctcgggt      480
ccgatgtttg cagcatgggc aaaatggctg ggtccgcagt ggtcaattgg tgattgggat      540
gggatgggta aagcactgcc ggatgaactg ccggaagatc tgctgcctgg tattgggttt      600
atgctgggtg atggtgaaag tgatggtgca gcaccgacc ctccgcagca tctgaaagaa      660
tatgatccgg aatgggggtg aagctgggca agcgggtttg ccaataccgg ttgtgaacat      720
gaagcagtta ttagccaggt gcgtgttccg gttctgctga cccatcattt tcgtcagatt      780
aatgaagaaa ccggtcatct gatgggtgca ctgagcgatc tgcaggcagc acagggttcgt      840
catatcattg aagaagttgc aggtcaagag gttacctatg ttagcctgga tgcaccgcac      900
accatgcatg aaccgcagcc ggaacgttat accgatgttc tgctggattg gggttaaaaaa      960
ctgggttaa                                     969
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<210> 29
 <211> 987
 <212> DNA
 <213> Artificial sequence

<220>
 <223> ORF was codon optimized and thus differce from natural occuring DNA sequence.

<220>
 <221> misc_feature
 <223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 13

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<400> 29
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agcgaaagtt ggtgggggta tgaaatggca atgtggctgc tgaaagatga ttatcaggtt      120
tttgagttg atatgcgtgg tcagggtcag agtacctgga caccgggtcg ttatagcctg      180
gatacctttg gtaatgatct ggtgaaattc atcgatatcg tgattaaacg tccgggttgt      240
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780 ggtagccgta ccagcgccac cggtcgttgt cgtaaaccgt ttcgtctcgc tcagtggtgg
 720 cgtcgcgtc cgggtgttcg tgaacgacc ggtacaacca ccgtcttgag cggcttgacc
 660 gatgcagtg gtcgcccctg tgcagcagc ggaagtcctg ccggtgttg tggctgagct
 600 ccgcgtctg gtcgtgcagc cgcagcagca gttcgttgtg cagctcgtgc agcagcaacc
 540 agcaaccatc tgggcgatac gttgggttgt ggtcgtccgg gtcgtgttca tgggtggcgt
 480 ctgacacagg ttgtgttcg ggtgttcgt caggcagcag gtcgcgtgtt tgaactcgtg
 420 gcaatgcctg gtcaggttcg tgcagtttcg ctggaagatc cgcctctgtt tagcagcgaa
 360 ccgcagttg ttgcaggtaa tagcagcgt ggtgttcctg cagcatgtc aagcgcctat
 300 tatagccctg atgattttg taatgatctg gttcgttttc tggcccctgt tgttcgcctg
 240 ttcatgttt ttgcagttga tctgcgttgt cgtgtcgtga gcaaccgtac accgcgtcgt
 180 ccggaacagg gttgtagtgt gttgtcttat gaacgtgtta tgcgcctgcc tgcacgcgat
 120 gaagtgttc tgaatcatgc agaagcaggt agtcggatc gtcggcatc ggtccggtg
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<400> 30
 <223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 14
 <221> misc_feature
 <220>

<223> ORF was codon optimized and thus difference from natural occurring DNA sequence.
 <220>
 <213> Artificial sequence
 <212> DNA
 <211> 843
 <210> 30

987 accagcgac cgaagcagg tcattaa
 960 gttgcaagcg caagcgaca gtttagcga gcaagcacc caccgctag ctgtaccagc
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 840 aacttcgc tggcaagcca tgatatgcat aattctgac cggcaacct tgttagcgca
 780 cagtttagc atgcacagg tctgattac accaatgca atcagagct taccctgaaa
 720 catcatagcc gtgcaattga tccgtatac gtaaatcga ttgtagcgt tagcgatacc
 660 gatgcaacct gtgatcatga agcaatgctg acccatgta aagttccgt tctgtttacc
 600 gatctgacac tgaatgaata tgatccgaa tgggtcatg gttttgtag tggcacctgt
 540 gaaatccgg catgattct gcagtatctg gtaatacca ccagtgtcc gaccggtctg
 480 tggctgggtg cacagtggac catgttgat caggcaggt tggttgcagc aatgccgaaa
 420 gcaattgtc agagtgttat gcagaccgt gcaggtcgt ttttaacct gtgtataaa
 360 ggtcagattc gtgcagcagt ttatgaagat ccgctctgt ttgcaagcca gagcaaacg
 300 gttagcgtc tgagcagcg tgggttgtg aggcattgc tgaagcatt tgcaaaaact

Sequence listing

Sequence listing

gcaggcggtg cccgtggtcc tcctccgcct cgtcagattc gcgcagatgt tcgtaccctg 840
taa 843

<210> 31
<211> 981
<212> DNA
<213> Artificial sequence

<220>
<221> misc_feature
<223> Artificial DNA sequence encodes polypeptid with SEQ ID NO: 15

<400> 31
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aaacaaattg atctgggtga agtggttctg aattatgcag aagcaggtac accggataaa 120
ccggcattac tgctgctgcc ggaacagacc ggtagttggt ggtcttatga accggcaatg 180
ggctctgctgg cagaacattt tcatgttttt gcagttgatc tgcgtgggtca gggtcgtagc 240
acctggacac cgggtcggtta tagcctggat aattttggta atgatctggt gcgttttatt 300
gactggcaa ttcgtcgtcc gggtgttggt gcaggttgta gcagcgggtg tgttctggca 360
gcatggctga ggcctatgc actgcctggt cagattcgtg gtgactgtg tgaagatgca 420
ccgctgtttg caagcgaact gacaccggca catggtcatg gtgttcgtca gggcgcaggt 480
ccggtttttg aactgtatcg tgattatctg ggcgatcagt ggtcagttgg tgattgggca 540
ggctctggtt cagcagcaca ggcaagtccg gcaaaaatga tgagcctggt taaaatgcct 600
ggatgaaccgc ctcaaatct gcgtgaatat gatccggaat gggcacgtgt ttttttgaa 660
ggcaccgttg gtctgcattg tccgcatgat cgtatgctga gccagggtta aacaccggtt 720
ctgattaccc atcatgcacg taccaccgat ccggaaaccg gtgaatttct gggcgcactg 780
agcgaactgc aggcagaacg tgcacaggcc attattcgtg cagccggtgt tccggttgat 840
tatcagagct ttccggatgc agcacatgca atgcatacca cagaaccggc acgttatgca 900
gcagttctga ccgcatgggc agcaaaactg cctccggttg cagataccag cccgtcagca 960
gcagcaagcg cacatgttta a 981

<210> 32
<211> 7
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(7)

<400> 32

Ala Gly Asn Ser Ser Gly Gly
1 5

Sequence listing

<210> 33
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 33

Arg Thr Ile Asp Pro Glu Thr
 1 5

<210> 34
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
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 <222> (1)..(7)

<400> 34

Asp Ala Leu His Met Met His
 1 5

<210> 35
 <211> 7
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<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 35

Ala Gly Asp Ser Ser Gly Gly
 1 5

<210> 36
 <211> 7
 <212> PRT
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<220>
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Sequence listing

<220>
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 <222> (1)..(7)

<400> 36

Ala Gly Asp Ser Ser Leu Gly
 1 5

<210> 37
 <211> 7
 <212> PRT
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<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 37

Ala Gly Gln Ser Ser Gly Gly
 1 5

<210> 38
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 38

Ala Gly His Ser Ser Gly Gly
 1 5

<210> 39
 <211> 7
 <212> PRT
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<220>
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<220>
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 <222> (1)..(7)

<400> 39

Ala Gly Ser Ser Ser Gly Gly
 1 5

<210> 40

Sequence listing

<211> 7
 <212> PRT
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<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 40

Ser Gly Asn Ser Ser Gly Gly
 1 5

<210> 41
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 41

Ser Gly Asp Ser Ser Gly Gly
 1 5

<210> 42
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

<400> 42

Ser Gly Gln Ser Ser Gly Gly
 1 5

<210> 43
 <211> 7
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
 <221> PEPTIDE
 <222> (1)..(7)

Sequence listing

<400> 43

Ser Gly His Ser Ser Gly Gly
1 5

<210> 44

<211> 7

<212> PRT

<213> Artificial sequence

<220>

<223> amino acid motif

<220>

<221> PEPTIDE

<222> (1)..(7)

<400> 44

Ser Gly Ser Ser Ser Gly Gly
1 5

<210> 45

<211> 7

<212> PRT

<213> Artificial sequence

<220>

<223> amino acid motif

<220>

<221> PEPTIDE

<222> (1)..(7)

<400> 45

Arg Thr Ile Asp Pro Glu Thr
1 5

<210> 46

<211> 7

<212> PRT

<213> Artificial sequence

<220>

<223> amino acid motif

<220>

<221> PEPTIDE

<222> (1)..(7)

<400> 46

Arg Asp Ile Asp Pro Asp Thr
1 5

<210> 47

<211> 7

<212> PRT

<213> Artificial sequence

Sequence listing

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(7)

<400> 47

Arg Gly Thr Asp Pro Glu Thr
1 5

<210> 48
<211> 7
<212> PRT
<213> Artificial sequence

<220>
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<220>
<221> PEPTIDE
<222> (1)..(7)

<400> 48

Arg Gly Ile Asp Pro Glu Thr
1 5

<210> 49
<211> 7
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
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<222> (1)..(7)

<400> 49

Asp Ala Leu His Met Met His
1 5

<210> 50
<211> 7
<212> PRT
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<220>
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<220>
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<222> (1)..(7)

<400> 50

Sequence listing

Asp Ala Ser His Met Met His
1 5

<210> 51
<211> 11
<212> PRT
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<220>
<223> amino acid motif

<220>
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<222> (1)..(11)

<400> 51

Val Val Ala Gly Asn Ser Ser Gly Gly Leu Leu
1 5 10

<210> 52
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
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<222> (1)..(11)

<400> 52

Ile Val Ala Gly Asn Ser Ser Gly Gly Val Leu
1 5 10

<210> 53
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(11)

<400> 53

His Ala Arg Thr Ile Asp Pro Glu Thr Gly Glu
1 5 10

<210> 54
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

Sequence listing

<220>
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 <222> (1)..(11)

<400> 54

His Met Arg Asp Ile Asp Pro Asp Thr Gly His
 1 5 10

<210> 55
 <211> 11
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
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 <222> (1)..(11)

<400> 55

His Met Arg Gly Thr Asp Pro Glu Thr Gly Asn
 1 5 10

<210> 56
 <211> 11
 <212> PRT
 <213> Artificial sequence

<220>
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<220>
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 <222> (1)..(11)

<400> 56

His Pro Asp Ala Leu His Met Met His Leu Phe
 1 5 10

<210> 57
 <211> 11
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
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 <222> (1)..(11)

<400> 57

Val Pro Asp Ala Leu His Met Met His Gln Phe
 1 5 10

Sequence listing

<210> 58
 <211> 11
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
 <221> PEPTIDE
 <222> (1)..(11)

<400> 58

Val Pro Asp Ala Ser His Met Met His Gln Ser
 1 5 10

<210> 59
 <211> 21
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
 <221> PEPTIDE
 <222> (1)..(21)

<400> 59

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

Ala Ala Trp Leu Ser
 20

<210> 60
 <211> 21
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
 <221> PEPTIDE
 <222> (1)..(21)

<400> 60

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

Ala Ala Trp Leu Ser
 20

<210> 61
 <211> 21

Sequence listing

<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(21)

<400> 61

Val Arg Arg Pro Val Val Val Ala Gly Asn Ser Ser Gly Gly Val Leu
1 5 10 15

Ala Ala Trp Leu Ser
20

<210> 62
<211> 21
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(21)

<400> 62

Val Lys Arg Pro Val Val Val Ala Gly Asn Ser Ser Gly Gly Val Leu
1 5 10 15

Ala Ala Trp Leu Ser
20

<210> 63
<211> 21
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(21)

<400> 63

Ile Leu Ile Thr His His Ala Arg Thr Ile Asp Pro Glu Thr Gly Glu
1 5 10 15

Leu Leu Gly Ala Leu
20

<210> 64

Sequence listing

<211> 21
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(21)

<400> 64

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

Leu Val Gly Ala Leu
20

<210> 65
<211> 21
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(21)

<400> 65

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

Leu Leu Gly Ala Leu
20

<210> 66
<211> 21
<212> PRT
<213> Artificial sequence

<220>
<223> amino acid motif

<220>
<221> PEPTIDE
<222> (1)..(21)

<400> 66

Val Leu Leu Thr His His Pro Asp Ala Leu His Met Met His Leu Phe
1 5 10 15

Leu Leu Gly Ala Leu
20

Sequence listing

<210> 67
 <211> 21
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
 <221> PEPTIDE
 <222> (1)..(21)

<400> 67

Val Asp Tyr Gln Ser His Pro Asp Ala Leu His Met Met His Leu Phe
 1 5 10 15

Asp Pro Ala Arg Tyr
 20

<210> 68
 <211> 21
 <212> PRT
 <213> Artificial sequence

<220>
 <223> amino acid motif

<220>
 <221> PEPTIDE
 <222> (1)..(21)

<400> 68

Val Asp Tyr Ala Ser Val Pro Asp Ala Leu His Met Met His Gln Phe
 1 5 10 15

Asp Pro Pro Arg Tyr
 20

<210> 69
 <211> 21
 <212> PRT
 <213> Artificial sequence

<220>
 <221> PEPTIDE
 <222> (1)..(21)

<400> 69

Val Asp Tyr Glu Ser Val Pro Asp Ala Ser His Met Met His Gln Ser
 1 5 10 15

Ala Pro Ala Arg Tyr
 20