

eolf-seq1.txt
SEQUENCE LISTING

<110> Global Bioenergies et al.
 <120> Method for the enzymatic production of isoprenol using mevalonate
 as a substrate
 <130> T2536 PCT S3
 <150> EP 12 16 3330.9
 <151> 2012-04-05
 <160> 22
 <170> PatentIn version 3.5
 <210> 1
 <211> 324
 <212> PRT
 <213> *Picrophilus torridus*
 <400> 1

Met Glu Asn Tyr Asn Val Lys Thr Arg Ala Phe Pro Thr Ile Gly Ile
 1 5 10 15

Ile Leu Leu Gly Gly Ile Ser Asp Lys Lys Asn Arg Ile Pro Leu His
 20 25 30

Thr Thr Ala Gly Ile Ala Tyr Thr Gly Ile Asn Asn Asp Val Tyr Thr
 35 40 45

Glu Thr Lys Leu Tyr Val Ser Lys Asp Glu Lys Cys Tyr Ile Asp Gly
 50 55 60

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

Lys Phe Lys His Glu Ile Leu Met Arg Val Asn Leu Asp Asp Glu Asn
 85 90 95

Asn Leu Ser Ile Asp Ser Arg Asn Phe Asn Ile Leu Ser Gly Ser Ser
 100 105 110

Asp Ser Gly Ala Ala Ala Leu Gly Glu Cys Ile Glu Ser Ile Phe Glu
 115 120 125

Tyr Asn Ile Asn Ile Phe Thr Phe Glu Asn Asp Leu Gln Arg Ile Ser
 130 135 140

Glu Ser Val Gly Arg Ser Leu Tyr Gly Gly Leu Thr Val Asn Tyr Ala
 145 150 155 160

Asn Gly Arg Glu Ser Leu Thr Glu Pro Leu Leu Glu Pro Glu Ala Phe
 165 170 175

Asn Asn Phe Thr Ile Ile Gly Ala His Phe Asn Ile Asp Arg Lys Pro
 Page 1

eof-seq1.txt

180

185

190

Ser Asn Glu Ile His Glu Asn Ile Ile Lys His Glu Asn Tyr Arg Glu
195 200 205

Arg Ile Lys Ser Ala Glu Arg Lys Ala Lys Lys Leu Glu Glu Leu Ser
210 215 220

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

Val Glu Tyr His Lys Met Leu His Asp Val Gly Val Asp Ile Ile Asn
245 250 255

Asp Arg Met Glu Asn Leu Ile Glu Arg Val Lys Glu Met Lys Asn Asn
260 265 270

Phe Trp Asn Ser Tyr Ile Val Thr Gly Gly Pro Asn Val Phe Val Ile
275 280 285

Thr Glu Lys Lys Asp Val Asp Lys Ala Met Glu Gly Leu Asn Asp Leu
290 295 300

Cys Asp Asp Ile Arg Leu Leu Lys Val Ala Gly Lys Pro Gln Val Ile
305 310 315 320

Ser Lys Asn Phe

<210> 2
<211> 318
<212> PRT
<213> Thermoplasma acidophilum

<400> 2

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

Val Leu Leu Gly Gly Ile Ala Asn Pro Val Thr Arg Thr Pro Leu His
20 25 30

Thr Ser Ala Gly Ile Ala Tyr Ser Asp Ser Cys Gly Ser Ile Arg Ser
35 40 45

Glu Thr Arg Ile Tyr Ala Asp Glu Ala Thr His Ile Tyr Phe Asn Gly
50 55 60

Thr Glu Ser Thr Asp Asp Asn Arg Ser Val Arg Arg Val Leu Asp Arg
65 70 75 80

Tyr Ser Ser Val Phe Glu Glu Ala Phe Gly Thr Lys Thr Val Ser Tyr
85 90 95

eof-seq1.txt

Ser Ser Gln Asn Phe Gly Ile Leu Ser Gly Ser Ser Asp Ala Gly Ala
100 105 110

Ala Ser Ile Gly Ala Ala Ile Leu Gly Leu Lys Pro Asp Leu Asp Pro
115 120 125

His Asp Val Glu Asn Asp Leu Arg Ala Val Ser Glu Ser Ala Gly Arg
130 135 140

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

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

Val Ala Phe Ala Phe Asp Tyr Gln Arg Asn Pro Ser Asp Val Ile His
180 185 190

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

Asp Glu His Ala His Met Ile Lys Glu Tyr Ala Lys Thr Asn Asp Ile
210 215 220

Lys Gly Ile Phe Asp Leu Ala Gln Glu Asp Thr Glu Glu Tyr His Ser
225 230 235 240

Ile Leu Arg Gly Val Gly Val Asn Val Ile Arg Glu Asn Met Gln Lys
245 250 255

Leu Ile Ser Tyr Leu Lys Leu Ile Arg Lys Asp Tyr Trp Asn Ala Tyr
260 265 270

Ile Val Thr Gly Gly Ser Asn Val Tyr Val Ala Val Glu Ser Glu Asn
275 280 285

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

Met Leu Arg Ile Val Gly Gly Ala Trp His Arg Arg Pro Glu
305 310 315

<210> 3
<211> 320
<212> PRT
<213> Thermoplasma volcanium

<400> 3

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

eo1f-seq1.txt

Val Leu Leu Gly₂₀ Gly Ile Ala Asn Glu₂₅ Lys Thr Arg Thr Pro₃₀ Leu His
 Thr Ser Ala₃₅ Gly Ile Ala Tyr Thr₄₀ Asp Ser Cys Gly₄₅ Ser Ile Arg Thr
 Glu Ser₅₀ Thr Ile Tyr Gly Asp₅₅ Ser Glu Met His Ile₆₀ Tyr Phe Asn Gly
 Thr₆₅ Glu Ser Lys Asp Glu₇₀ Asn Arg Ser Val Lys₇₅ Ser Val Leu Glu Arg₈₀
 Tyr Arg Asn Glu₈₅ Leu Gln Ser Phe Phe Gly₉₀ Lys Lys Asp Val₉₅ Ser Tyr
 Ser Ser Leu Asn₁₀₀ Tyr Gly Ile Leu Ser₁₀₅ Gly Ser Ser Asp Ala₁₁₀ Gly Ala
 Ala Ser Ile₁₁₅ Gly Ala Ile Leu Ser₁₂₀ Phe Ile Asp Lys Lys₁₂₅ Asn Asp Ile
 His Asp₁₃₀ Ile Glu Asn Asp Ile₁₃₅ Arg Met Ile Ser Glu₁₄₀ Ser Ala Gly Arg
 Ser₁₄₅ Leu His Gly Gly Leu₁₅₀ Thr Ile Thr Trp Ser₁₅₅ Asp Gly Tyr Ser Ala₁₆₀
 Tyr Thr Glu Arg Val₁₆₅ Leu Gly Pro Glu His₁₇₀ Phe Asn Asn Tyr Ala₁₇₅ Ile
 Val Gly Phe Ser₁₈₀ Phe Asp Tyr Pro Arg₁₈₅ Asn Pro Ser Asp Thr₁₉₀ Ile His
 Gln Asn Ile₁₉₅ Ile Lys Ser Lys Arg₂₀₀ Tyr Lys Gln Arg Thr₂₀₅ Ile Asp Ala
 Asp Glu₂₁₀ His Ala His Glu Ile₂₁₅ Lys Glu Met Ala Arg₂₂₀ Thr Asp Asp Ile
 Glu₂₂₅ Gly Ile Phe Glu Lys₂₃₀ Ala Glu Glu Asp Thr₂₃₅ Glu Glu Tyr His Ser₂₄₀
 Ile Leu Arg Glu Val₂₄₅ Gly Val Leu Val Ile₂₅₀ Arg Glu Asn Met Gln₂₅₅ Lys
 Leu Ile Glu Phe₂₆₀ Ile Lys Ile Leu Arg₂₆₅ Lys Glu Phe Trp Asn₂₇₀ Ser Tyr
 Ile Val Thr₂₇₅ Gly Gly Ser Asn Val₂₈₀ Tyr Val Ile Val Arg₂₈₅ Arg Asp Asp

eof-seq1.txt

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

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

<210> 4

<211> 322

<212> PRT

<213> Ferroplasma acidarmanus fer1

<400> 4

Met Glu Lys Tyr Tyr Val Glu Val Lys Ala Tyr Pro Thr Ile Gly Ile
1 5 10 15

Leu Leu Leu Gly Gly Val Ser Asp Asn Lys Lys Arg Leu Pro Arg His
20 25 30

Thr Thr Ala Gly Ile Ala Tyr Thr Gly Leu Asp Asp Asp Ile Tyr Val
35 40 45

Lys Thr Asp Leu Tyr Leu Ser Asn Gln Lys Ser Gly Ile Ile Asn Gly
50 55 60

Lys Glu Val Ser Pro Asp Ser Pro Arg Ser Pro Phe Val Val Ile Asp
65 70 75 80

Lys Tyr Arg His Glu Ile Leu Met Arg His Pro Glu Tyr Ser Glu Val
85 90 95

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

Gly Ala Ala Ala Ile Gly Glu Cys Ile Gln Ser Ile Phe Glu Tyr Asn
115 120 125

Ile Asn Ile Phe Asn Phe Glu Asn Asp Leu Gln Gln Ile Ser Glu Ser
130 135 140

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

Lys Glu Ser Leu Thr Asp Glu Ile Leu Gly Pro Glu Asp Phe Glu Asp
165 170 175

Phe Val Ile Val Ala Cys Lys Phe Ser Glu Asp Arg Lys Pro Ser Asp
180 185 190

Thr Ile His Ser Asn Ile Ile Asn His Glu Lys Tyr Ala Glu Arg Val
195 200 205

eof-seq1.txt

Lys Asn Ser Glu Leu Arg Ala Lys Glu Leu Glu Lys Met Ala Asp Ser
210 215 220

Gly Asp Ile Lys Gly Ile Phe Glu Ala Gly Glu Lys Asp Thr Gln Glu
225 230 235 240

Tyr His Ser Met Leu Arg Glu Val Gly Val Ser Ile Ile Thr Asp Glu
245 250 255

Met Gln Arg Leu Ile Glu Lys Val Glu Glu Leu Lys Ala Glu Phe Trp
260 265 270

Asn Ala Tyr Ile Val Thr Gly Gly Thr Asn Val Phe Val Ala Val Glu
275 280 285

Arg Lys Asn Met Glu Lys Met Lys Asn Ala Ala Met Glu Phe Lys Cys
290 295 300

Thr Pro Val Tyr Leu Lys Val Ala Gly Lys Pro Asp Val Ile Ser Lys
305 310 315 320

Asn Phe

<210> 5
<211> 315
<212> PRT
<213> Streptococcus gordonii
<400> 5

Met Asp Arg Lys Pro Val Ser Val Lys Ser Tyr Ala Asn Ile Ala Ile
1 5 10 15

Val Lys Tyr Trp Gly Lys Lys Asp Ala Glu Lys Met Ile Pro Ser Thr
20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Gln Leu
35 40 45

Ser Pro Leu Pro Ala Thr Ala Thr Gly Asp Glu Phe Tyr Ile Asp Gly
50 55 60

Gln Leu Gln Ser Pro Ala Glu His Thr Lys Ile Ser Lys Ile Ile Asp
65 70 75 80

Arg Phe Arg Ser Pro Glu Asp Gly Phe Val Arg Val Asp Thr Ser Asn
85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Gly Leu Ser
100 105 110

Ala Leu Val Lys Ala Cys Asn Ala Tyr Phe Gln Thr Gly Tyr Gln Ala
Page 6

eof-seq1.txt

115

120

125

Gln Glu Leu Ala Gln Leu Ala Lys Phe Ala Ser Gly Ser Ser Ala Arg
130 135 140

Ser Phe Phe Gly Pro Leu Ala Ala Trp Asp Lys Asp Ser Gly Ala Ile
145 150 155 160

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

His Asp Glu Lys Lys Pro Ile Ser Ser Arg Asp Gly Met Glu Leu Cys
180 185 190

Ala Lys Thr Ser Thr Ile Phe Pro Asp Trp Ile Ala Gln Ser Ala Leu
195 200 205

Asp Tyr Gln Ala Met Leu Ala Tyr Leu Arg Asp Asn Glu Phe Ala Lys
210 215 220

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

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

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

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Leu Glu Glu
275 280 285

Asp Leu Asp His Leu Ala Ala Ile Leu Glu Lys Asp Tyr Arg Leu Ile
290 295 300

Val Ser Lys Thr Lys Asp Leu Ser Asp Glu Ser
305 310 315

<210> 6

<211> 315

<212> PRT

<213> Streptococcus gordonii str. Challis substr. CH1

<400> 6

Met Asp Arg Lys Pro Val Ser Val Lys Ser Tyr Ala Asn Ile Ala Ile
1 5 10 15

Val Lys Tyr Trp Gly Lys Lys Asp Ala Glu Lys Met Ile Pro Ser Thr
20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Gln Leu
35 40 45

eo1f-seq1.txt

Ser Pro Leu Pro Asp Thr Ala Thr Gly Asp Glu Phe Tyr Ile Asp Gly
50 55 60

Gln Leu Gln Ser Pro Ala Glu His Ala Lys Ile Ser Lys Ile Ile Asp
65 70 75 80

Arg Phe Arg Ser Pro Glu Asp Gly Phe Val Arg Val Asp Thr Ser Asn
85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Ser Gly Leu Ser
100 105 110

Ala Leu Val Lys Ala Cys Asn Ala Tyr Phe Gln Thr Gly Tyr Gln Thr
115 120 125

Glu Glu Leu Ala Gln Leu Ala Lys Phe Ala Ser Gly Ser Ser Ala Arg
130 135 140

Ser Phe Phe Gly Pro Leu Ala Ala Trp Asp Lys Asp Ser Gly Ala Ile
145 150 155 160

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

His Asp Glu Lys Lys Pro Ile Ser Ser Arg Asp Gly Met Glu Leu Cys
180 185 190

Ala Lys Thr Ser Thr Ile Phe Pro Asp Trp Ile Ala Gln Ser Ala Leu
195 200 205

Asp Tyr Gln Ala Met Leu Gly Tyr Leu Gln Asp Asn Asp Phe Ala Lys
210 215 220

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

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

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

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Leu Glu Glu
275 280 285

Asp Leu Asp His Leu Ala Ala Ile Phe Glu Lys Asp Tyr Arg Leu Ile
290 295 300

Val Ser Lys Thr Lys Asp Leu Ser Asp Glu Ser
305 310 315

eof-seq1.txt

<210> 7
 <211> 311
 <212> PRT
 <213> Streptococcus infantarius subsp infantarius ATCC BAA-102

<400> 7

Met Asp Arg Lys Ile Val Thr Val Lys Ser Tyr Ala Asn Ile Ala Ile
 1 5 10 15

Ile Lys Tyr Trp Gly Lys Ala Asp Ala Ala Lys Met Ile Pro Ala Thr
 20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Phe Thr Thr Thr Ser Val
 35 40 45

Ser Phe Leu Pro Asp Ser Ala Ser His Asp Glu Phe Tyr Ile Asn Gly
 50 55 60

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

Gln Tyr Arg Gly Gln Arg Ser Glu Tyr Val Lys Val Glu Thr Ser Asn
 85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Ser Gly Leu Ser
 100 105 110

Ala Leu Val Lys Ala Cys Asn Glu Leu Phe Glu Thr Gly Leu Thr Arg
 115 120 125

Ala Glu Leu Ala Gln Lys Ala Lys Phe Ala Ser Gly Ser Ser Ser Arg
 130 135 140

Ser Phe Phe Gly Pro Leu Ala Ala Trp Asp Lys Asp Ser Gly Glu Val
 145 150 155 160

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

Ser Asp Ser Lys Lys Ser Ile Ser Ser Arg Glu Gly Met Lys Arg Cys
 180 185 190

Val Glu Thr Ser Thr Thr Phe Ala Asp Trp Val Lys Gln Ser Glu Gln
 195 200 205

Asp Tyr Lys Asp Met Leu Gly Tyr Leu Lys Asn Asn Asp Phe Glu Arg
 210 215 220

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

eo1f-seq1.txt

Thr His Ala Asn Pro Pro Phe Asn Tyr Leu Thr Glu Glu Ser Tyr Lys
245 250 255

Ala Met Glu Phe Val Lys Gln Leu Arg Ser Glu Gly Glu Lys Cys Tyr
260 265 270

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Leu Glu Glu
275 280 285

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

Val Ser Arg Thr Lys Glu Leu
305 310

<210> 8
<211> 391
<212> PRT
<213> Dictyostelium discoideum
<400> 8

Met Val Leu Ala Ser Val Thr Cys Thr Ala Pro Val Asn Ile Ala Val
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20 25 30

Ser Ser Leu Ser Gly Thr Leu His Gln Asp Asp Leu Lys Thr Thr Thr
35 40 45

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

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

Met Ile Arg Ser Arg Ala Thr Lys Leu Met Asp Lys Lys His Cys Val
85 90 95

His Ile Ala Ser Ile Asn Asn Phe Pro Thr Ala Ala Gly Leu Ala Ser
100 105 110

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

Gly Val Asp Gly Asp Ile Ser Gly Ile Ala Arg Leu Gly Ser Gly Ser
130 135 140

Ala Cys Arg Ser Met Tyr Gly Gly Phe Val Lys Trp Glu Met Gly Thr
145 150 155 160

eof-seq1.txt

Lys Asp Asp Gly Ser₁₆₅ Asp Ser Ile Ala Val₁₇₀ Gln Val Gln Pro Glu₁₇₅ Ser

His Trp Pro Asp₁₈₀ Met Asn Ile Ile Val₁₈₅ Leu Val Val Asn Asp₁₉₀ Lys Lys

Lys Glu Thr₁₉₅ Ser Ser Thr Asp Gly₂₀₀ Met Gln Lys Ser Ala₂₀₅ Ala Thr Ser

Val Met₂₁₀ Met Lys Glu Arg Cys₂₁₅ Ala Val Thr Val Pro₂₂₀ Asn Arg Met Arg

Asp Ile Glu Glu Ala Ile₂₃₀ Asn Lys Lys Asp Phe₂₃₅ Gln Thr Phe Gly Asp₂₄₀

Ile Thr Met Lys Asp₂₄₅ Ser Asp Asp Phe His₂₅₀ Glu Val Cys Ala Thr₂₅₅ Thr

Thr Pro Pro Ile₂₆₀ Tyr Tyr Leu Asn Asp₂₆₅ Thr Ser Arg Tyr Ile₂₇₀ Met Asn

Leu Ile His₂₇₅ Arg Tyr Asn Lys Leu₂₈₀ Ser Gly Ser Ile Lys₂₈₅ Cys Ala Tyr

Thr Phe₂₉₀ Asp Ala Gly Pro Asn₂₉₅ Ala Cys Ile Tyr Leu₃₀₀ Pro Ala Glu Ser

Thr Thr Glu Val Leu₃₁₀ Ser Leu Phe Met Lys His₃₁₅ Phe Pro Gly Asp Asp₃₂₀

Met Gln Thr Tyr Tyr₃₂₅ Arg Gly Pro Lys Glu₃₃₀ Asn Ile Pro Ser Ile₃₃₅ Glu

Asn Phe Val Pro₃₄₀ Ser Glu Lys Leu Ala₃₄₅ Ser Leu Tyr Thr Pro₃₅₀ Asp Thr

Thr Phe Val₃₅₅ Asn Ser Leu Lys Tyr₃₆₀ Ile Leu His Thr Lys₃₆₅ Val Gly Pro

Gly Pro Gln Ile Leu Ser Glu₃₇₅ Ser Glu Ser Leu Ile₃₈₀ Asp Asn Thr Thr

Gly₃₈₅ Leu Pro Lys Gln Leu Asn₃₉₀

<210> 9
<211> 319
<212> PRT
<213> Lactobacillus delbrueckii

<400> 9

Met Ser Lys Thr Ala Arg Ala His Thr Asn Ile Ala Leu Ile Lys Tyr

eo1f-seq1.txt

1 5 10 15

Trp Gly Lys Lys₂₀ Asp Ala Lys Leu Arg₂₅ Leu Pro Leu Met Ser₃₀ Ser Leu

Ser Met Thr₃₅ Leu Asp Ala Phe Tyr₄₀ Ser Asp Thr Lys Ile₄₅ Ser Asp Ser

Glu Gln₅₀ Met Ser Phe Lys Leu₅₅ Asn Gly Gln Ala Val₆₀ Ser Gly Pro Ala

Ala Asp Arg Val Phe Ala₇₀ Tyr Leu Arg Ala Met₇₅ Gln Asp Arg Phe Gly₈₀

Val Lys Gly Asn₈₅ Leu Ala Val Glu Ser Val₉₀ Asn Gln Val Pro Thr₉₅ Ala

Ala Gly Leu Ala₁₀₀ Ser Ser Ser Ser Ala₁₀₅ Phe Ala Ala Met Ala₁₁₀ Ala Ala

Phe Ala Asp₁₁₅ His Tyr Gln Leu Gly₁₂₀ Val Asp Arg Gln Glu₁₂₅ Leu Ser Arg

Met Ala₁₃₀ Arg Met Gly Ser Gly₁₃₅ Ser Ala Ser Arg Ser Val Phe Gly Gly

Phe Ser Val Trp Gln Lys₁₅₀ Gly Asp Ser Asp Gln₁₅₅ Thr Ser Tyr Ala Tyr₁₆₀

Pro Leu Asp Glu Glu₁₆₅ Pro Asp Met Asp Leu₁₇₀ Arg Leu Leu Ala Val₁₇₅ Glu

Ile Asn Asp Gln Glu Lys Lys Ile Ser₁₈₅ Ser Thr Lys Gly Met₁₉₀ Glu Met

Ser Lys Ser₁₉₅ Ser Pro Phe Tyr Gln Val Trp Leu Asp Arg₂₀₅ Asn Asp Ser

Glu Ile₂₁₀ Lys Glu Met Glu Glu₂₁₅ Ala Ile Lys Gln Ala₂₂₀ Asp Phe Ser Lys

Leu Gly Ser Leu Ala Glu₂₃₀ Leu Asn Ala Ser Glu₂₃₅ Met His Thr Leu Thr₂₄₀

Phe Thr Ala Val Pro₂₄₅ Gly Phe Thr Tyr Phe₂₅₀ Glu Pro Asn Thr Ile₂₅₅ Lys

Ala Ile Lys Leu₂₆₀ Val Gln Asp Leu Arg₂₆₅ Gln Gln Gly Leu Glu₂₇₀ Cys Tyr

Tyr Thr Ile Asp Ala Gly Pro Asn Val Lys Val Leu Cys Gln Gly Lys

275

280

285

Asn Ser Lys Asp Ile Ile Asn Cys Phe Glu Ser Ser Phe Asp Arg Val
 290 295 300

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

<210> 10

<211> 317

<212> PRT

<213> Streptococcus mitis (strain B6)

<400> 10

Met Asp Arg Glu Pro Val Thr Val Arg Ser Tyr Ala Asn Ile Ala Ile
 1 5 10 15

Ile Lys Tyr Trp Gly Lys Lys Lys Glu Lys Glu Met Val Pro Ala Thr
 20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Thr Leu
 35 40 45

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

Gln Leu Gln Asn Glu Ala Glu His Val Lys Met Ser Lys Ile Ile Asp
 65 70 75 80

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

Ser Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Ser Gly Leu Ser
 100 105 110

Ala Leu Val Lys Ala Cys Asn Ala Tyr Phe Lys Leu Gly Leu Asn Arg
 115 120 125

Ser Gln Leu Ala Gln Glu Ala Lys Phe Ala Ser Gly Ser Ser Ser Arg
 130 135 140

Ser Phe Tyr Gly Pro Leu Gly Ala Trp Asp Lys Asp Ser Gly Glu Ile
 145 150 155 160

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

Glu Asp Lys Lys Lys Pro Ile Ser Ser Arg Asp Gly Met Lys Leu Cys
 180 185 190

Val Glu Thr Ser Thr Thr Phe Asp Asp Trp Val Arg Gln Ser Glu Lys
 195 200 205

eof-seq1.txt

Asp Tyr Gln Asp Met Leu Val Tyr Leu Lys Ala Asn Asp Phe Ala Lys
210 215 220

Val Gly Glu Leu Thr Glu Lys Asn Ala Leu Ala Met His Ala Thr Thr
225 230 235 240

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

Ala Met Asp Phe Val Arg Gln Leu Arg Glu Gln Gly Glu Ala Cys Tyr
260 265 270

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Gln Glu Lys
275 280 285

Asp Leu Glu His Leu Ser Glu Ile Phe Gly Gln Arg Tyr Arg Leu Ile
290 295 300

Val Ser Lys Thr Lys Asp Leu Ser Gln Asp Gly Cys Cys
305 310 315

<210> 11
<211> 316
<212> PRT
<213> Streptococcus gallolyticus UCN34
<400> 11

Met Asp Arg Lys Ile Val Thr Val Lys Ser Tyr Ala Asn Ile Ala Ile
1 5 10 15

Ile Lys Tyr Trp Gly Lys Ala Asp Ala Val Lys Met Ile Pro Ala Thr
20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Phe Thr Thr Thr Thr Val
35 40 45

Ser Phe Leu Pro Gln Ser Val Gly His Asp Glu Phe Tyr Ile Asn Gly
50 55 60

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

Gln Tyr Arg Gly Gly Arg Ser Glu Phe Val Lys Val Glu Thr Ser Asn
85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Ser Gly Leu Ser
100 105 110

Ala Leu Val Lys Ala Cys Asn Glu Leu Phe Glu Thr Gly Leu Asn Gln
115 120 125

eo1f-seq1.txt

Ser Glu Leu Ala Gln Lys Ala Lys Phe Ala Ser Gly Ser Ser Ser Arg
130 135 140

Ser Phe Phe Gly Pro Ile Ala Ala Trp Asp Lys Asp Ser Gly Asp Ile
145 150 155 160

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

Ser Asp Ser Lys Lys Pro Ile Ser Ser Arg Glu Gly Met Lys Arg Cys
180 185 190

Ala Glu Thr Ser Thr Thr Phe Ala Asp Trp Val Lys Gln Ser Glu Gln
195 200 205

Asp Tyr Lys Asp Met Leu Ala Tyr Leu Lys Ala Asn Asp Phe Glu Lys
210 215 220

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

Thr His Ala Asn Pro Pro Phe Asn Tyr Leu Thr Asp Glu Thr Tyr Ala
245 250 255

Ala Met Asp Phe Val Lys Ser Leu Arg Thr Gln Gly Glu Lys Cys Tyr
260 265 270

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Leu Glu Glu
275 280 285

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

Ala Ser Arg Thr Lys Val Leu Pro Asp Glu Asn Asp
305 310 315

<210> 12
<211> 315
<212> PRT
<213> Streptococcus sanguinis SK36

<400> 12

Met Asp Arg Lys Pro Val Ser Val Lys Ser Tyr Ala Asn Ile Ala Ile
1 5 10 15

Val Lys Tyr Trp Gly Lys Lys Asp Ala Glu Lys Met Ile Pro Ser Thr
20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Gln Leu
35 40 45

co1f-seq1.txt

Ser Pro Leu Pro Asp Thr Ala Thr Gly Asp Glu Phe Tyr Ile Asp Ser
50 55 60

Gln Leu Gln Ser Pro Ala Glu His Ala Lys Ile Ser Lys Ile Ile Asp
65 70 75 80

Arg Phe Arg Ser Pro Glu Asp Gly Phe Val Arg Val Asp Thr Ser Asn
85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Ser Gly Leu Ser
100 105 110

Ala Leu Val Lys Ala Cys Asn Ala Tyr Phe Gln Thr Gly Tyr Gln Thr
115 120 125

Gln Glu Leu Ala Gln Leu Ala Lys Phe Ala Ser Gly Ser Ser Ala Arg
130 135 140

Ser Phe Phe Gly Pro Leu Ala Ala Trp Asp Lys Asp Ser Gly Ala Ile
145 150 155 160

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

His Asp Glu Lys Lys Pro Ile Ser Ser Arg Asp Gly Met Glu Leu Cys
180 185 190

Ala Lys Thr Ser Thr Ile Phe Pro Asp Trp Ile Ala Gln Ser Ala Leu
195 200 205

Asp Tyr Lys Ala Met Leu Ser Tyr Leu Gln Asp Asn Asp Phe Ala Lys
210 215 220

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

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

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

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Leu Glu Glu
275 280 285

Asp Leu Asp His Leu Val Ala Ile Phe Glu Lys Asp Tyr Arg Leu Ile
290 295 300

Val Ser Lys Thr Lys Asp Leu Ser Asp Glu Asp
305 310 315

eo1f-seq1.txt

<210> 13
 <211> 317
 <212> PRT
 <213> Streptococcus sp. M143

<400> 13

Met Asp Arg Lys Pro Val Thr Val Arg Ser Tyr Ala Asn Ile Ala Ile
 1 5 10 15

Ile Lys Tyr Trp Gly Lys Lys Lys Glu Lys Glu Met Val Pro Ala Thr
 20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Thr Leu
 35 40 45

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

Gln Leu Gln Ser Glu Ala Glu His Ala Lys Met Ser Lys Ile Ile Asp
 65 70 75 80

Arg Tyr Arg Pro Ala Gly Glu Gly Phe Val Arg Ile Asp Thr Gln Asn
 85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Gly Leu Ser
 100 105 110

Ala Leu Val Lys Ala Cys Asn Ala Tyr Phe Gln Leu Gly Leu Asn Arg
 115 120 125

Ser Gln Leu Ala Gln Glu Ala Lys Phe Ala Ser Gly Ser Ser Ser Arg
 130 135 140

Ser Phe Tyr Gly Pro Leu Gly Ala Trp Asp Lys Asp Ser Gly Glu Ile
 145 150 155 160

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

Glu Asp Lys Lys Lys Pro Ile Ser Ser Arg Asp Gly Met Lys Leu Cys
 180 185 190

Val Glu Thr Ser Thr Thr Phe Asp Asp Trp Val Arg Gln Ser Glu Lys
 195 200 205

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

Val Gly Glu Leu Thr Glu Lys Asn Ala Leu Ala Met His Ala Thr Thr
 225 230 235 240

Lys Thr Ala Ser Pro Ala Phe Ser Tyr Leu Thr Asp Ala Ser Tyr Glu

Ala Met Asp Phe Val Arg Gln Leu Arg Glu Gln Gly Glu Ser Cys Tyr
 260 265 270

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Leu Cys Gln Glu Glu
 275 280 285

Asp Leu Glu His Leu Ser Glu Ile Phe Gly Gln Arg Tyr Arg Leu Ile
 290 295 300

Val Ser Lys Thr Lys Asp Leu Ser Gln Asp Asp Cys Cys
 305 310 315

<210> 14

<211> 341

<212> PRT

<213> Streptococcus suis 89/1591

<400> 14

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

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

Ser Ser Leu Ser Leu Thr Leu Asp Ala Phe Tyr Thr Asp Thr Lys Val
 35 40 45

Val Phe Asp Pro Glu Leu Thr Ala Asp Glu Phe Tyr Leu Asn Gly Met
 50 55 60

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

Phe Cys Glu Tyr Ile Gly Glu Arg Ala Phe Ala Arg Val Glu Ser Leu
 85 90 95

Asn Phe Val Pro Thr Ala Ala Gly Leu Ala Ser Ser Ala Ser Ala Phe
 100 105 110

Ala Ala Leu Ala Leu Ala Thr Ala Thr Ala Leu Asp Leu Asp Leu Ser
 115 120 125

Pro Ala Thr Leu Ser Thr Leu Ala Arg Arg Gly Ser Gly Ser Ser Thr
 130 135 140

Arg Ser Leu Phe Gly Gly Phe Val Glu Trp Asp Met Gly Thr Gly Ser
 145 150 155 160

Glu Asp Ser Met Ala His Pro Ile Asp Asp Ala Asp Trp Asp Ile Gly
 165 170 175

eo1f-seq1.txt

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

Glu Gly Met Asp His Thr Val Ala Thr Ser Pro Phe Tyr Ser Ala Trp
195 200 205

Val Asp Thr Ala Lys Gln Asp Leu Ala Asp Ile Lys Ala Ala Ile Ala
210 215 220

Gly Arg Asp Phe Glu Lys Leu Gly Gln Ile Thr Glu His Asn Gly Met
225 230 235 240

Lys Met His Ala Thr Thr Leu Ser Ala Asn Pro Pro Phe Thr Tyr Trp
245 250 255

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

Ala Thr Gly Leu Ser Ala Tyr Met Thr Met Asp Ala Gly Pro Asn Val
275 280 285

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

Ala Lys Val Phe Pro Arg Glu Lys Ile Ile Thr Ser Lys Pro Gly Pro
305 310 315 320

Ala Ala Tyr Val Leu Ser Glu Asp Glu Trp Gln Thr Ser Gln Ala Ala
325 330 335

Phe Glu Lys Gly Leu
340

<210> 15
<211> 314
<212> PRT
<213> Streptococcus salivarius SK126

<400> 15

Met Asp Arg Lys Pro Val Ser Val Lys Ser Tyr Ala Asn Ile Ala Ile
1 5 10 15

Val Lys Tyr Trp Gly Lys Ala Asp Ala Glu Arg Met Ile Pro Ser Thr
20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Lys Leu
35 40 45

Ser Phe Leu Pro Glu Asp Ala Thr Gly Asp Val Met Tyr Ile Asp Asp
50 55 60

eo1f-seq1.txt

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

<210> 16
 <211> 325
 <212> PRT

<213> Thermoplasma acidophilum

<400> 16

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

eo1f-seq1.txt

Ile Arg Glu Asn Met Gln Lys Leu Ile Ser Tyr Leu Lys Leu Ile Arg
260 265 270

Lys Asp Tyr Trp Asn Ala Tyr Ile Val Thr Gly Gly Ser Asn Val Tyr
275 280 285

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

Thr Phe Gly Ser Lys Lys Lys Met Leu Arg Ile Val Gly Gly Ala Trp
305 310 315 320

His Arg Arg Pro Glu
325

<210> 17
<211> 267
<212> PRT
<213> Methanosarcina mazei

<400> 17

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

Cys Glu Asn Leu Glu Asn Glu Leu Lys Arg Cys Phe Glu Gly Leu Glu
20 25 30

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

Met Tyr Ser Gly Lys Val Ala Ala His Val Tyr Ala Thr Leu Pro Glu
50 55 60

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

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

Asp Val Asp Leu Glu Leu Ala Asp Gly Phe Leu Gly Ser Ile Val Asp
100 105 110

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

Pro Phe Leu Gln Tyr Arg Phe Glu Arg Asp Phe Lys Ile Leu Pro Ile
130 135 140

Cys Met Gly Met Gln Asp Glu Glu Thr Ala Val Glu Val Gly Asn Leu
145 150 155 160

Leu Ala Asp Leu Ile Ser Glu Ser Gly Lys Arg Ala Val Ile Ile Ala

eo1f-seq1.txt

165

170

175

Ser Ser Asp Phe Thr His Tyr Glu Thr Ala Glu Arg Ala Lys Glu Ile
180 185 190

Asp Ser Glu Val Ile Asp Ser Ile Leu Asn Phe Asp Ile Ser Gly Met
195 200 205

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

Ile Thr Ala Met Leu Thr Ala Ser Lys Lys Leu Gly Gly Ser Arg Ala
225 230 235 240

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

Ala Val Val Gly Tyr Ala Ala Ile Ile Val Glu
260 265

<210> 18
<211> 326
<212> PRT
<213> Sulfolobus tokodaii

<400> 18

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

Lys Tyr Trp Gly Lys Arg Asn Glu Glu Leu Asn Leu Pro Leu Asn Ser
20 25 30

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

Phe Ser Lys Glu Phe Thr Lys Asp Glu Val Tyr Ile Asn Gly Glu Arg
50 55 60

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

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

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

Ala Ala Leu Val Tyr Ala Thr Asn Glu Ala Leu Glu Leu Gly Leu Ser
115 120 125

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

eo1f-seq1.txt

Arg Ser Thr Ala Gly Gly Phe Val Leu Trp Glu Lys Gly Glu Arg Asp
145 150 155 160

Asp Gly Glu Asp Ser Tyr Cys Tyr Ser Leu Phe Pro Glu Asn His Trp
165 170 175

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

Ile Ser Ser Arg Glu Gly Met Ile Ile Thr Ala Lys Thr Ser Asn Leu
195 200 205

Met Lys Cys Arg Leu Lys Phe Ile Glu Glu Thr Leu Pro Lys Val Ile
210 215 220

Lys Ser Ile Glu Glu Arg Asn Glu Lys Glu Phe Tyr Tyr Trp Leu Met
225 230 235 240

Arg His Ser Asn Ser Met His Ala Val Ile Leu Asp Ser Trp Pro Ser
245 250 255

Phe Phe Tyr Leu Asn Asp Thr Ser Leu Lys Ile Met Glu Trp Ile Gln
260 265 270

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

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

Ser Ile Gly Val Asn Lys Ile Ile Ile Ser Lys Val Gly Ser Gly Pro
305 310 315 320

Lys Val Asn Lys Leu Leu
325

<210> 19
<211> 317
<212> PRT
<213> Streptococcus pneumonia
<400> 19

Met Asp Arg Glu Pro Val Thr Val Arg Ser Tyr Ala Asn Ile Ala Ile
1 5 10 15

Ile Lys Tyr Trp Gly Lys Lys Lys Glu Lys Glu Met Val Pro Ala Thr
20 25 30

Ser Ser Ile Ser Leu Thr Leu Glu Asn Met Tyr Thr Glu Thr Thr Leu
35 40 45

eo1f-seq1.txt

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

Gln Leu Gln Asn Glu Val Glu His Ala Lys Met Ser Lys Ile Ile Asp
65 70 75 80

Arg Tyr Arg Pro Ala Gly Glu Gly Phe Val Arg Ile Asp Thr Gln Asn
85 90 95

Asn Met Pro Thr Ala Ala Gly Leu Ser Ser Ser Ser Ser Gly Leu Ser
100 105 110

Ala Leu Val Lys Ala Cys Asn Ala Tyr Phe Lys Leu Gly Leu Asp Arg
115 120 125

Ser Gln Leu Ala Gln Glu Ala Lys Phe Ala Ser Gly Ser Ser Ser Arg
130 135 140

Ser Phe Tyr Gly Pro Leu Gly Ala Trp Asp Lys Asp Ser Gly Glu Ile
145 150 155 160

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

Glu Asp Lys Lys Lys Pro Ile Ser Ser Arg Asp Gly Met Lys Leu Cys
180 185 190

Val Glu Thr Ser Thr Thr Phe Asp Asp Trp Val Arg Gln Ser Glu Lys
195 200 205

Asp Tyr Gln Asp Met Leu Ile Tyr Leu Lys Glu Asn Asp Phe Ala Lys
210 215 220

Ile Gly Glu Leu Thr Glu Lys Asn Ala Leu Ala Met His Ala Thr Thr
225 230 235 240

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

Ala Met Ala Phe Val Arg Gln Leu Arg Glu Lys Gly Glu Ala Cys Tyr
260 265 270

Phe Thr Met Asp Ala Gly Pro Asn Val Lys Val Phe Cys Gln Glu Lys
275 280 285

Asp Leu Glu His Leu Ser Glu Ile Phe Gly Gln Arg Tyr Arg Leu Ile
290 295 300

Val Ser Lys Thr Lys Asp Leu Ser Gln Asp Asp Cys Cys
305 310 315

eo1f-seq1.txt

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<210> 20
<211> 389
<212> PRT
<213> Chloroflexus aggregans

<400> 20
Met Asn Glu Ser Ser Ile Pro Gln Gly Phe Ala Asp Leu Val Ala Pro
1 5 10 15

Met Arg Thr Ala His Glu Arg Ile Ile Ala Asp Leu Arg Arg His His
20 25 30

Ile Glu Leu Pro Pro Pro Pro His Leu Pro Pro Ala Cys Arg Gln Gly
35 40 45

Ile Ala Ala Ala Arg Ala Phe Pro Met Gln Gly Val Leu Lys Tyr His
50 55 60

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

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

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

Arg Glu Leu Glu Arg Ile Val His Val Leu Asp Thr Val Arg Ser Leu
115 120 125

Ala Gly Ile Thr Ser His Ala Arg Val Val Ser Arg Asn Ile Val Arg
130 135 140

Thr Arg Thr Thr Gly Lys Gly Leu Gly Thr Ser Ala Ser Ala Ala Ala
145 150 155 160

Ala Leu Ala Cys Ala Ala Val Gly Ala Ile Phe Gly Pro Glu Leu Ala
165 170 175

Gly His Thr Arg Phe Leu Ser Thr Leu Ala Arg Arg Leu Ala Gly Ser
180 185 190

Gly Cys Arg Ser Ala Ala Gly Gly Leu Ala Leu Trp Leu Ser Tyr Pro
195 200 205

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

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

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eof-seq1.txt

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

Phe Arg Ala Trp Met Leu Ala Arg Gly Asp Glu Val Arg Glu Cys Ile
260 265 270

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

Leu Asp Ser Met Arg Leu His Gly Val Thr Met Ser Gly Ser Arg Glu
290 295 300

Gln Lys Ile Ile Gly Trp Glu Pro Glu Asn Ile Thr Leu Phe Arg Leu
305 310 315 320

Cys Asn Asp Leu Arg Ala Arg Gly Val Pro Val Tyr Ala Ser Thr Asp
325 330 335

Thr Gly Pro Thr Val Val Phe Ile Thr Arg Arg Asp Phe Ala Pro Ile
340 345 350

Val Thr Asp Ala Ile His His Ser Gly Leu Asn Val Glu Thr Val Ile
355 360 365

Ala Pro Ile Gly Gly Pro Ala His Leu Ile Pro Val Glu Glu Ala Leu
370 375 380

Ala Glu Leu Gln Ser
385

<210> 21
<211> 324
<212> PRT
<213> Natronomonas pharaonis
<400> 21

Met Lys Ala Thr Ala Lys Ala His Pro Ile Gln Gly Leu Val Lys Tyr
1 5 10 15

His Gly Met Arg Asn Glu Glu Leu Arg Leu Pro Tyr His Asp Ser Ile
20 25 30

Ser Val Cys Thr Ala Pro Ser His Ser Lys Thr Thr Ala Ala Phe Glu
35 40 45

Pro Glu Arg Asp Ala Asp Arg Tyr Val Val Asp Gly Glu Val Val Asp
50 55 60

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

Val Ala Asp Ile Asp His Arg Val Arg Leu Glu Ser Glu Asn Asp Phe
Page 27

Pro Thr Asn Ile Gly Phe Gly Ser Ser Ser Ser Gly Phe Ala Ala Ala
 100 105 110

Ala Val Ala Leu Val Glu Ala Ala Gly Leu Glu Leu Ser His Pro Glu
 115 120 125

Ile Ser Thr Val Ala Arg Arg Gly Ser Ser Ser Ala Ala Arg Ala Val
 130 135 140

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

Tyr Ser Glu Arg Leu Asp Thr Asp Leu Glu Asp Asp Leu Arg Thr Val
 165 170 175

Ala Ala Glu Ile Pro Ala Phe Lys His Thr Glu Glu Ala His Lys Glu
 180 185 190

Ala Ala Asp Ser His Met Phe Glu Ala Arg Leu Ala His Ile His Glu
 195 200 205

Gln Ile Ala Thr Met Arg Asn Ala Leu Arg Glu Asn Asp Phe Asp Arg
 210 215 220

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

Met Thr Gly Pro Ala Gly Trp Val Tyr Trp Gln Pro Glu Thr Leu Ser
 245 250 255

Val Phe Glu Thr Val Arg Thr Leu Arg Glu Asp Asp Asp Ile Pro Val
 260 265 270

Tyr Phe Ser Thr Asp Thr Gly Ala Ser Val Tyr Val Asn Thr Thr Ala
 275 280 285

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

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

Glu Ser Leu Phe

<210> 22
 <211> 396
 <212> PRT
 <213> Saccharomyces cerevisiae

eo1f-seq1.txt

<400> 22

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Met Thr Val Tyr Thr Ala Ser Val Thr Ala Pro Val Asn Ile Ala Thr
1      5      10      15

Leu Lys Tyr Trp Gly Lys Arg Asp Thr Lys Leu Asn Leu Pro Thr Asn
20      25      30

Ser Ser Ile Ser Val Thr Leu Ser Gln Asp Asp Leu Arg Thr Leu Thr
35      40      45

Ser Ala Ala Thr Ala Pro Glu Phe Glu Arg Asp Thr Leu Trp Leu Asn
50      55      60

Gly Glu Pro His Ser Ile Asp Asn Glu Arg Thr Gln Asn Cys Leu Arg
65      70      75      80

Asp Leu Arg Gln Leu Arg Lys Glu Met Glu Ser Lys Asp Ala Ser Leu
85      90      95

Pro Thr Leu Ser Gln Trp Lys Leu His Ile Val Ser Glu Asn Asn Phe
100     105     110

Pro Thr Ala Ala Gly Leu Ala Ser Ser Ala Ala Gly Phe Ala Ala Leu
115     120     125

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

Ile Ser Arg Ile Ala Arg Lys Gly Ser Gly Ser Ala Cys Arg Ser Leu
145     150     155     160

Phe Gly Gly Tyr Val Ala Trp Glu Met Gly Lys Ala Glu Asp Gly His
165     170     175

Asp Ser Met Ala Val Gln Ile Ala Asp Ser Ser Asp Trp Pro Gln Met
180     185     190

Lys Ala Cys Val Leu Val Val Ser Asp Ile Lys Lys Asp Val Ser Ser
195     200     205

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

Arg Ile Glu His Val Val Pro Lys Arg Phe Glu Val Met Arg Lys Ala
225     230     235     240

Ile Val Glu Lys Asp Phe Ala Thr Phe Ala Lys Glu Thr Met Met Asp
245     250     255

Ser Asn Ser Phe His Ala Thr Cys Leu Asp Ser Phe Pro Pro Ile Phe
260     265     270

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eo1f-seq1.txt

Tyr Met Asn Asp Thr Ser Lys Arg Ile Ile Ser Trp Cys His Thr Ile
 275 280 285
 Asn Gln Phe Tyr Gly Glu Thr Ile Val Ala Tyr Thr Phe Asp Ala Gly
 290 295 300
 Pro Asn Ala Val Leu Tyr Tyr Leu Ala Glu Asn Glu Ser Lys Leu Phe
 305 310 315 320
 Ala Phe Ile Tyr Lys Leu Phe Gly Ser Val Pro Gly Trp Asp Lys Lys
 325 330 335
 Phe Thr Thr Glu Gln Leu Glu Ala Phe Asn His Gln Phe Glu Ser Ser
 340 345 350
 Asn Phe Thr Ala Arg Glu Leu Asp Leu Glu Leu Gln Lys Asp Val Ala
 355 360 365
 Arg Val Ile Leu Thr Gln Val Gly Ser Gly Pro Gln Glu Thr Asn Glu
 370 375 380
 Ser Leu Ile Asp Ala Lys Thr Gly Leu Pro Lys Glu
 385 390 395