

SEQUENCE LISTING

<110> PFENEX INC.

<120> METHOD FOR PRODUCTION OF RECOMBINANT ERWINIA ASPARAGINASE

<130> 38194-749.601

<140>

<141>

<150> 62/578,305

<151> 2017-10-27

<160> 63

<170> PatentIn version 3.5

<210> 1

<211> 327

<212> PRT

<213> Erwinia chrysanthemi

<400> 1

Ala Asp Lys Leu Pro Asn Ile Val Ile Leu Ala Thr Gly Gly Thr Ile
1 5 10 15

Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr Gly Tyr Lys Ala Gly
20 25 30

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

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

Met Thr Gly Asp Val Val Leu Lys Leu Ser Gln Arg Val Asn Glu Leu
65 70 75 80

Leu Ala Arg Asp Asp Val Asp Gly Val Val Ile Thr His Gly Thr Asp
85 90 95

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

Lys Pro Val Val Phe Val Ala Ala Met Arg Pro Ala Thr Ala Ile Ser
115 120 125

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

Lys Gln Ser Arg Gly Arg Gly Val Met Val Val Leu Asn Asp Arg Ile
145 150 155 160

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

Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val Ile Ile Gly Asn Arg
180 185 190

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

Phe Asp Val Arg Gly Leu Thr Ser Leu Pro Lys Val Asp Ile Leu Tyr
210 215 220

Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp Ala Ala Ile Gln His
225 230 235 240

Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly Ala Gly Ser Val Ser
245 250 255

Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met Glu Lys Gly Val Val
260 265 270

Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile Val Pro Pro Asp Glu
275 280 285

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

Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser Asp Pro Lys Val Ile
305 310 315 320

Gln Glu Tyr Phe His Thr Tyr
325

<210> 2
 <211> 981
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 2
 gcagacaaac tccctaacat cgtaatcctc gcaactgggtg gtaccatcgc aggcagcgcc 60
 gccaccggca cgcagaccac tggctacaag gccggcgcgc tgggcgtaga cacgctgatc 120
 aacgccgtcc cggaagtga gaaactggcc aacgtcaagg gtgagcaatt ctccaacatg 180
 gccagcgaga acatgactgg cgatgtggta ctgaagctct cgcagcgcggt gaacgaactg 240
 ctgccccgcg acgacgtgga cggcgtgggtg atcaccacg gcactgatac cgtcgaagag 300
 tcggcggtact ttctccacct gaccgtgaag tccgataagc ccgtgggtgtt tgtcgccgcg 360
 atgcgccccg cgaccgcat cagcgccgac gggccgatga atctgttgga agccgtgcgc 420
 gtggcgggtg acaagcaaag ccgcggtcgg ggcgtaatgg tcgtcctgaa cgatcggatc 480
 ggtagcgcg cgtacatcac caagacgaac gcctccacgc tggacacctt caaggcgaac 540
 gaagaggggt acctgggggt gatcattggc aatcgtatct attaccagaa ccgcatcgac 600
 aagctgcaca ccacccgctc ggtgttcgac gtgcgcggtc tgactagcct gccaaggtc 660
 gacatcctgt acggctacca agacgacccg gactacctct acgacgcggc gatccagcat 720
 ggcgtgaagg gcatcgtcta cgccgggtatg ggtgccggct cgggtgtcggc ccgcggcatc 780
 gcgggtatgc gcaaggccat ggagaaaggc gtggctcgtga ttcgctcgac ccggactggc 840
 aatggcatcg taccgcccga tgaagaactc ccggggctcg tgagcgatag cctcaacccc 900
 gcgcacgccc ggatcctgct gatgctggcg ctacgcgga ccagcgaccc caaggtcatt 960
 caagagtact tccacaccta c 981

<210> 3
 <211> 22
 <212> PRT
 <213> Pseudomonas fluorescens

<400> 3
 Met Arg Asn Leu Ile Leu Ser Ala Ala Leu Val Thr Ala Ser Leu Phe
 1 5 10 15

Gly Met Thr Ala Gln Ala
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<210> 4
<211> 66
<212> DNA
<213> *Pseudomonas fluorescens*

<400> 4
atgcgtaatc tgatcctcag cgccgctctc gtcactgcc a gcctcttcgg catgaccgca 60
caagct 66

<210> 5
<211> 20
<212> PRT
<213> *Pseudomonas fluorescens*

<400> 5
Met Phe Ala Lys Leu Val Ala Val Ser Leu Leu Thr Leu Ala Ser Gly
1 5 10 15

Gln Leu Leu Ala
20

<210> 6
<211> 60
<212> DNA
<213> *Pseudomonas fluorescens*

<400> 6
atgtttgcc aactcgttgc tgtttccctg ctgactctgg cgagcggcca gttgcttgct 60

<210> 7
<211> 23
<212> PRT
<213> *Pseudomonas fluorescens*

<400> 7
Met Gln Asn Tyr Lys Lys Phe Leu Leu Ala Ala Ala Val Ser Met Ala
1 5 10 15

Phe Ser Ala Thr Ala Met Ala
20

<210> 8

<211> 69
<212> DNA
<213> Pseudomonas fluorescens

<400> 8
atgcagaact ataaaaaatt ctttctggcc gcggccgtct cgatggcggtt cagcgccacg 60
gccatggca 69

<210> 9
<211> 31
<212> PRT
<213> Pseudomonas fluorescens

<400> 9
Met Ile Arg Asp Asn Arg Leu Lys Thr Ser Leu Leu Arg Gly Leu Thr
1 5 10 15

Leu Thr Leu Leu Ser Leu Thr Leu Leu Ser Pro Ala Ala His Ala
20 25 30

<210> 10
<211> 93
<212> DNA
<213> Pseudomonas fluorescens

<400> 10
atgatccgtg acaaccgact caagacatcc cttctgcgcg gcctgaccct caccctactc 60
agcctgaccc tgctctcgcc cgcggcccat gcc 93

<210> 11
<211> 21
<212> PRT
<213> Pseudomonas fluorescens

<400> 11
Met Arg Asn Leu Leu Arg Gly Met Leu Val Val Ile Cys Cys Met Ala
1 5 10 15

Gly Ile Ala Ala Ala
20

<210> 12
<211> 63
<212> DNA
<213> Pseudomonas fluorescens

<400> 12
atgagaaacc ttcttcgagg aatgcttgtc gttatttgct gtatggcagg gatagcggcg 60
gcc 63

<210> 13
<211> 21
<212> PRT
<213> Pseudomonas fluorescens

<400> 13
Met Asn Arg Ser Ser Ala Leu Leu Leu Ala Phe Val Phe Leu Ser Gly
1 5 10 15

Cys Gln Ala Met Ala
20

<210> 14
<211> 63
<212> DNA
<213> Pseudomonas fluorescens

<400> 14
atgaatagat cttccgcgtt gctcctcgct tttgtcttcc tcagcggctg ccaggccatg 60
gcc 63

<210> 15
<211> 33
<212> PRT
<213> Pseudomonas fluorescens

<400> 15
Met Gln Asn Arg Thr Val Glu Ile Gly Val Gly Leu Phe Leu Leu Ala
1 5 10 15

Gly Ile Leu Ala Leu Leu Leu Leu Ala Leu Arg Val Ser Gly Leu Ser
20 25 30

Ala

<210> 16
<211> 99
<212> DNA
<213> Pseudomonas fluorescens

<400> 16
 atgcaaaacc gcactgtgga aatcggtgtc ggccttttct tgctggctgg catcctggct 60
 ttactgttgt tggccctgcg agtcagcggc ctttcggcc 99

<210> 17
 <211> 21
 <212> PRT
 <213> Pseudomonas fluorescens

<400> 17
 Met Lys Phe Lys Gln Leu Met Ala Met Ala Leu Leu Leu Ala Leu Ser
 1 5 10 15

Ala Val Ala Gln Ala
 20

<210> 18
 <211> 63
 <212> DNA
 <213> Pseudomonas fluorescens

<400> 18
 atgaagttca aacagctgat ggcgatggcg cttttgttgg ccttgagcgc tgtggcccag 60
 gcc 63

<210> 19
 <211> 23
 <212> PRT
 <213> Pseudomonas fluorescens

<400> 19
 Met Pro Pro Arg Ser Ile Ala Ala Cys Leu Gly Leu Leu Gly Leu Leu
 1 5 10 15

Met Ala Thr Gln Ala Ala Ala
 20

<210> 20
 <211> 69
 <212> DNA
 <213> Pseudomonas fluorescens

<400> 20
 atgccgcctc gttctatcgc cgcatgtctg gggctgctgg gcttgctcat ggctaccag 60
 gccgccgcc 69

<210> 21
<211> 24
<212> PRT
<213> Pseudomonas fluorescens

<400> 21
Met Leu Phe Arg Thr Leu Leu Ala Ser Leu Thr Phe Ala Val Ile Ala
1 5 10 15

Gly Leu Pro Ser Thr Ala His Ala
20

<210> 22
<211> 72
<212> DNA
<213> Pseudomonas fluorescens

<400> 22
atgctttttc gcacattact ggcgagcctt acctttgctg tcatcgccgg cttaccgtcc 60
acggcccacg cg 72

<210> 23
<211> 24
<212> PRT
<213> Pseudomonas fluorescens

<400> 23
Met Lys Leu Lys Arg Leu Met Ala Ala Met Thr Phe Val Ala Ala Gly
1 5 10 15

Val Ala Thr Ala Asn Ala Val Ala
20

<210> 24
<211> 72
<212> DNA
<213> Pseudomonas fluorescens

<400> 24
atgaaactga aacgtttgat ggcggcaatg acttttgtcg ctgctggcgt tgcgaccgcc 60
aacgcggtgg cc 72

<210> 25
<211> 24

<212> PRT

<213> *Pseudomonas fluorescens*

<400> 25

Met	Lys	Leu	Lys	Arg	Leu	Met	Ala	Ala	Met	Thr	Phe	Val	Ala	Ala	Gly
1				5					10					15	

Val	Ala	Thr	Val	Asn	Ala	Val	Ala
			20				

<210> 26

<211> 72

<212> DNA

<213> *Pseudomonas fluorescens*

<400> 26

atgaaactga	aacgtttgat	ggcggcaatg	acttttgtcg	ctgctggcgt	tcgaccgtc	60
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aacgcggtgg	cc	72
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<210> 27

<211> 21

<212> PRT

<213> *Pseudomonas fluorescens*

<400> 27

Met	Arg	Leu	Thr	Gln	Ile	Ile	Ala	Ala	Ala	Ala	Ile	Ala	Leu	Val	Ser
1				5					10					15	

Thr	Phe	Ala	Leu	Ala
			20	

<210> 28

<211> 63

<212> DNA

<213> *Pseudomonas fluorescens*

<400> 28

atgcgcttga	cccagattat	tgccgccgca	gccattgcgt	tggtttccac	ctttgcgctc	60
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gcc		63
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<210> 29

<211> 21

<212> PRT

<213> *Pseudomonas fluorescens*

<400> 29

Met Lys Lys Ser Thr Leu Ala Val Ala Val Thr Leu Gly Ala Ile Ala
1 5 10 15

Gln Gln Ala Gly Ala
20

<210> 30
<211> 63
<212> DNA
<213> Pseudomonas fluorescens

<400> 30
atgaagaagt ccaccttggc tgtggctgta acgttgggcg caatcgcca gcaagcaggc 60
gct 63

<210> 31
<211> 29
<212> PRT
<213> Pseudomonas fluorescens

<400> 31
Met Gln Ser Leu Pro Phe Ser Ala Leu Arg Leu Leu Gly Val Leu Ala
1 5 10 15

Val Met Val Cys Val Leu Leu Thr Thr Pro Ala Arg Ala
20 25

<210> 32
<211> 87
<212> DNA
<213> Pseudomonas fluorescens

<400> 32
atgcaaagcc tgccgttctc tgcgttacgc ctgctcgggtg tgctggcagt catggtctgc 60
gtgctgttga cgacgccagc ccgtgcc 87

<210> 33
<211> 18
<212> PRT
<213> Pseudomonas fluorescens

<400> 33
Met Arg Gln Leu Phe Phe Cys Leu Met Leu Met Val Ser Leu Thr Ala
1 5 10 15

His Ala

<210> 34

<211> 54

<212> DNA

<213> Pseudomonas fluorescens

<400> 34

atgcgacaac tatttttctg ttgatgctg atggtgtcgc tcacggcgca cgcc

54

<210> 35

<211> 348

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 35

Met Lys Phe Lys Gln Leu Met Ala Met Ala Leu Leu Leu Ala Leu Ser
1 5 10 15

Ala Val Ala Gln Ala Ala Asp Lys Leu Pro Asn Ile Val Ile Leu Ala
20 25 30

Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr
35 40 45

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

Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe Ser Asn
65 70 75 80

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

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

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

Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro
130 135 140

Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu Ala Val
145 150 155 160

Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val
165 170 175

Leu Asn Asp Arg Ile Gly Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala
180 185 190

Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val
195 200 205

Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His
210 215 220

Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu Pro Lys
225 230 235 240

Val Asp Ile Leu Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp
245 250 255

Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly
260 265 270

Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met
275 280 285

Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile
290 295 300

Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn
305 310 315 320

Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser
325 330 335

Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr

340

345

<210> 36

<211> 345

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 36

Met Arg Gln Leu Phe Phe Cys Leu Met Leu Met Val Ser Leu Thr Ala
 1 5 10 15

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

Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr Gly Tyr Lys
 35 40 45

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

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

Glu Asn Met Thr Gly Asp Val Val Leu Lys Leu Ser Gln Arg Val Asn
 85 90 95

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

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

Ser Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro Ala Thr Ala
 130 135 140

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

Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val Leu Asn Asp

165

170

175

Arg Ile Gly Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala Ser Thr Leu
 180 185 190

Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val Ile Ile Gly
 195 200 205

Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His Thr Thr Arg
 210 215 220

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

Leu Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp Ala Ala Ile
 245 250 255

Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly Ala Gly Ser
 260 265 270

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

Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile Val Pro Pro
 290 295 300

Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn Pro Ala His
 305 310 315 320

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

Val Ile Gln Glu Tyr Phe His Thr Tyr
 340 345

<210> 37

<211> 348

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

polypeptide

<400> 37

Met Arg Leu Thr Gln Ile Ile Ala Ala Ala Ile Ala Leu Val Ser
1 5 10 15

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

Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr
35 40 45

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

Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe Ser Asn
65 70 75 80

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

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

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

Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro
130 135 140

Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu Ala Val
145 150 155 160

Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val
165 170 175

Leu Asn Asp Arg Ile Gly Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala
180 185 190

Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val
195 200 205

Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His
210 215 220

Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu Pro Lys
225 230 235 240

Val Asp Ile Leu Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp
245 250 255

Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly
260 265 270

Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met
275 280 285

Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile
290 295 300

Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn
305 310 315 320

Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser
325 330 335

Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
340 345

<210> 38

<211> 358

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 38

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

Leu Thr Leu Leu Ser Leu Thr Leu Leu Ser Pro Ala Ala His Ala Ala
20 25 30

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

Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr Gly Tyr Lys Ala Gly Ala
50 55 60

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

Ala Asn Val Lys Gly Glu Gln Phe Ser Asn Met Ala Ser Glu Asn Met
85 90 95

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

Ala Arg Asp Asp Val Asp Gly Val Val Ile Thr His Gly Thr Asp Thr
115 120 125

Val Glu Glu Ser Ala Tyr Phe Leu His Leu Thr Val Lys Ser Asp Lys
130 135 140

Pro Val Val Phe Val Ala Ala Met Arg Pro Ala Thr Ala Ile Ser Ala
145 150 155 160

Asp Gly Pro Met Asn Leu Leu Glu Ala Val Arg Val Ala Gly Asp Lys
165 170 175

Gln Ser Arg Gly Arg Gly Val Met Val Val Leu Asn Asp Arg Ile Gly
180 185 190

Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala Ser Thr Leu Asp Thr Phe
195 200 205

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

Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His Thr Thr Arg Ser Val Phe
225 230 235 240

Asp Val Arg Gly Leu Thr Ser Leu Pro Lys Val Asp Ile Leu Tyr Gly

245

250

255

Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp Ala Ala Ile Gln His Gly
 260 265 270

Val Lys Gly Ile Val Tyr Ala Gly Met Gly Ala Gly Ser Val Ser Val
 275 280 285

Arg Gly Ile Ala Gly Met Arg Lys Ala Met Glu Lys Gly Val Val Val
 290 295 300

Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile Val Pro Pro Asp Glu Glu
 305 310 315 320

Leu Pro Gly Leu Val Ser Asp Ser Leu Asn Pro Ala His Ala Arg Ile
 325 330 335

Leu Leu Met Leu Ala Leu Thr Arg Thr Ser Asp Pro Lys Val Ile Gln
 340 345 350

Glu Tyr Phe His Thr Tyr
 355

<210> 39

<211> 356

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 polypeptide

<400> 39

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

Val Met Val Cys Val Leu Leu Thr Thr Pro Ala Arg Ala Ala Asp Lys
 20 25 30

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

Ala Ala Thr Gly Thr Gln Thr Thr Gly Tyr Lys Ala Gly Ala Leu Gly

50

55

60

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

Val Lys Gly Glu Gln Phe Ser Asn Met Ala Ser Glu Asn Met Thr Gly
85 90 95

Asp Val Val Leu Lys Leu Ser Gln Arg Val Asn Glu Leu Leu Ala Arg
100 105 110

Asp Asp Val Asp Gly Val Val Ile Thr His Gly Thr Asp Thr Val Glu
115 120 125

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

Val Phe Val Ala Ala Met Arg Pro Ala Thr Ala Ile Ser Ala Asp Gly
145 150 155 160

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

Arg Gly Arg Gly Val Met Val Val Leu Asn Asp Arg Ile Gly Ser Ala
180 185 190

Arg Tyr Ile Thr Lys Thr Asn Ala Ser Thr Leu Asp Thr Phe Lys Ala
195 200 205

Asn Glu Glu Gly Tyr Leu Gly Val Ile Ile Gly Asn Arg Ile Tyr Tyr
210 215 220

Gln Asn Arg Ile Asp Lys Leu His Thr Thr Arg Ser Val Phe Asp Val
225 230 235 240

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

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

Gly Ile Val Tyr Ala Gly Met Gly Ala Gly Ser Val Ser Val Arg Gly
275 280 285

Ile Ala Gly Met Arg Lys Ala Met Glu Lys Gly Val Val Val Ile Arg
290 295 300

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

Gly Leu Val Ser Asp Ser Leu Asn Pro Ala His Ala Arg Ile Leu Leu
325 330 335

Met Leu Ala Leu Thr Arg Thr Ser Asp Pro Lys Val Ile Gln Glu Tyr
340 345 350

Phe His Thr Tyr
355

<210> 40

<211> 348

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 40

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

Cys Gln Ala Met Ala Ala Asp Lys Leu Pro Asn Ile Val Ile Leu Ala
20 25 30

Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr
35 40 45

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

Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe Ser Asn
65 70 75 80

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

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

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

Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro
130 135 140

Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu Ala Val
145 150 155 160

Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val
165 170 175

Leu Asn Asp Arg Ile Gly Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala
180 185 190

Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val
195 200 205

Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His
210 215 220

Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu Pro Lys
225 230 235 240

Val Asp Ile Leu Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp
245 250 255

Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly
260 265 270

Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met
275 280 285

Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile

290

295

300

Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn
 305 310 315 320

Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser
 325 330 335

Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
 340 345

<210> 41

<211> 360

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 polypeptide

<400> 41

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

Gly Ile Leu Ala Leu Leu Leu Leu Ala Leu Arg Val Ser Gly Leu Ser
 20 25 30

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

Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr Gly Tyr Lys Ala
 50 55 60

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

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

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

Leu Leu Ala Arg Asp Asp Val Asp Gly Val Val Ile Thr His Gly Thr

115

120

125

Asp Thr Val Glu Glu Ser Ala Tyr Phe Leu His Leu Thr Val Lys Ser
 130 135 140

Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro Ala Thr Ala Ile
 145 150 155 160

Ser Ala Asp Gly Pro Met Asn Leu Leu Glu Ala Val Arg Val Ala Gly
 165 170 175

Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val Leu Asn Asp Arg
 180 185 190

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

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

Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His Thr Thr Arg Ser
 225 230 235 240

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

Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp Ala Ala Ile Gln
 260 265 270

His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly Ala Gly Ser Val
 275 280 285

Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met Glu Lys Gly Val
 290 295 300

Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile Val Pro Pro Asp
 305 310 315 320

Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn Pro Ala His Ala
 325 330 335

Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser Asp Pro Lys Val
340 345 350

Ile Gln Glu Tyr Phe His Thr Tyr
355 360

<210> 42

<211> 351

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 42

Met Leu Phe Arg Thr Leu Leu Ala Ser Leu Thr Phe Ala Val Ile Ala
1 5 10 15

Gly Leu Pro Ser Thr Ala His Ala Ala Asp Lys Leu Pro Asn Ile Val
20 25 30

Ile Leu Ala Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr
35 40 45

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

Asn Ala Val Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln
65 70 75 80

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

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

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

Leu His Leu Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala
130 135 140

Met Arg Pro Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu
145 150 155 160

Glu Ala Val Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val
165 170 175

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

Thr Asn Ala Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr
195 200 205

Leu Gly Val Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp
210 215 220

Lys Leu His Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser
225 230 235 240

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

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

Gly Met Gly Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg
275 280 285

Lys Ala Met Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly
290 295 300

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

Ser Leu Asn Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr
325 330 335

Arg Thr Ser Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
340 345 350

<211> 348
<212> PRT
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 43

Met Arg Asn Leu Leu Arg Gly Met Leu Val Val Ile Cys Cys Met Ala
1 5 10 15

Gly Ile Ala Ala Ala Ala Asp Lys Leu Pro Asn Ile Val Ile Leu Ala
20 25 30

Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr
35 40 45

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

Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe Ser Asn
65 70 75 80

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

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

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

Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro
130 135 140

Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu Ala Val
145 150 155 160

Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val
165 170 175

Leu Asn Asp Arg Ile Gly Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala

180

185

190

Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val
 195 200 205

Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His
 210 215 220

Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu Pro Lys
 225 230 235 240

Val Asp Ile Leu Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp
 245 250 255

Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly
 260 265 270

Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met
 275 280 285

Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile
 290 295 300

Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn
 305 310 315 320

Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser
 325 330 335

Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
 340 345

<210> 44

<211> 349

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 polypeptide

<400> 44

Met Arg Asn Leu Ile Leu Ser Ala Ala Leu Val Thr Ala Ser Leu Phe

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

His Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu Pro
225 230 235 240

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

Asp Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met
260 265 270

Gly Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala
275 280 285

Met Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly
290 295 300

Ile Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu
305 310 315 320

Asn Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr
325 330 335

Ser Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
340 345

<210> 45

<211> 351

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 45

Met Lys Leu Lys Arg Leu Met Ala Ala Met Thr Phe Val Ala Ala Gly
1 5 10 15

Val Ala Thr Val Asn Ala Val Ala Ala Asp Lys Leu Pro Asn Ile Val
20 25 30

Ile Leu Ala Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr
35 40 45

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

Asn Ala Val Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln
65 70 75 80

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

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

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

Leu His Leu Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala
130 135 140

Met Arg Pro Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu
145 150 155 160

Glu Ala Val Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val
165 170 175

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

Thr Asn Ala Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr
195 200 205

Leu Gly Val Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp
210 215 220

Lys Leu His Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser
225 230 235 240

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

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

260

265

270

Gly Met Gly Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg
 275 280 285

Lys Ala Met Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly
 290 295 300

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

Ser Leu Asn Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr
 325 330 335

Arg Thr Ser Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
 340 345 350

<210> 46

<211> 350

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
 polypeptide

<400> 46

Met Pro Pro Arg Ser Ile Ala Ala Cys Leu Gly Leu Leu Gly Leu Leu
 1 5 10 15

Met Ala Thr Gln Ala Ala Ala Ala Asp Lys Leu Pro Asn Ile Val Ile
 20 25 30

Leu Ala Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln
 35 40 45

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

Ala Val Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe
 65 70 75 80

Ser Asn Met Ala Ser Glu Asn Met Thr Gly Asp Val Val Leu Lys Leu

85

90

95

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

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

His Leu Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met
 130 135 140

Arg Pro Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu
 145 150 155 160

Ala Val Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met
 165 170 175

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

Asn Ala Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu
 195 200 205

Gly Val Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys
 210 215 220

Leu His Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu
 225 230 235 240

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

Tyr Asp Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly
 260 265 270

Met Gly Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys
 275 280 285

Ala Met Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn
 290 295 300

Gly Ile Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser
305 310 315 320

Leu Asn Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg
325 330 335

Thr Ser Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
340 345 350

<210> 47

<211> 350

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic
polypeptide

<400> 47

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

Phe Ser Ala Thr Ala Met Ala Ala Asp Lys Leu Pro Asn Ile Val Ile
20 25 30

Leu Ala Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln
35 40 45

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

Ala Val Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe
65 70 75 80

Ser Asn Met Ala Ser Glu Asn Met Thr Gly Asp Val Val Leu Lys Leu
85 90 95

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

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

His Leu Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met
130 135 140

Arg Pro Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu
145 150 155 160

Ala Val Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met
165 170 175

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

Asn Ala Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu
195 200 205

Gly Val Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys
210 215 220

Leu His Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu
225 230 235 240

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

Tyr Asp Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly
260 265 270

Met Gly Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys
275 280 285

Ala Met Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn
290 295 300

Gly Ile Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser
305 310 315 320

Leu Asn Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg
325 330 335

Thr Ser Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr

340

345

350

<210> 48

<211> 348

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 48

Met Lys Lys Ser Thr Leu Ala Val Ala Val Thr Leu Gly Ala Ile Ala
 1 5 10 15

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

Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr Gln Thr Thr
 35 40 45

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

Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln Phe Ser Asn
 65 70 75 80

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

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

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

Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala Met Arg Pro
 130 135 140

Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu Glu Ala Val
 145 150 155 160

Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val Met Val Val

165

170

175

Leu Asn Asp Arg Ile Gly Ser Ala Arg Tyr Ile Thr Lys Thr Asn Ala
 180 185 190

Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr Leu Gly Val
 195 200 205

Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp Lys Leu His
 210 215 220

Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser Leu Pro Lys
 225 230 235 240

Val Asp Ile Leu Tyr Gly Tyr Gln Asp Asp Pro Glu Tyr Leu Tyr Asp
 245 250 255

Ala Ala Ile Gln His Gly Val Lys Gly Ile Val Tyr Ala Gly Met Gly
 260 265 270

Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg Lys Ala Met
 275 280 285

Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly Asn Gly Ile
 290 295 300

Val Pro Pro Asp Glu Glu Leu Pro Gly Leu Val Ser Asp Ser Leu Asn
 305 310 315 320

Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr Arg Thr Ser
 325 330 335

Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
 340 345

<210> 49

<211> 351

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Synthetic

polypeptide

<400> 49

Met Lys Leu Lys Arg Leu Met Ala Ala Met Thr Phe Val Ala Ala Gly
1 5 10 15

Val Ala Thr Ala Asn Ala Val Ala Ala Asp Lys Leu Pro Asn Ile Val
20 25 30

Ile Leu Ala Thr Gly Gly Thr Ile Ala Gly Ser Ala Ala Thr Gly Thr
35 40 45

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

Asn Ala Val Pro Glu Val Lys Lys Leu Ala Asn Val Lys Gly Glu Gln
65 70 75 80

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

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

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

Leu His Leu Thr Val Lys Ser Asp Lys Pro Val Val Phe Val Ala Ala
130 135 140

Met Arg Pro Ala Thr Ala Ile Ser Ala Asp Gly Pro Met Asn Leu Leu
145 150 155 160

Glu Ala Val Arg Val Ala Gly Asp Lys Gln Ser Arg Gly Arg Gly Val
165 170 175

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

Thr Asn Ala Ser Thr Leu Asp Thr Phe Lys Ala Asn Glu Glu Gly Tyr
195 200 205

Leu Gly Val Ile Ile Gly Asn Arg Ile Tyr Tyr Gln Asn Arg Ile Asp
 210 215 220

Lys Leu His Thr Thr Arg Ser Val Phe Asp Val Arg Gly Leu Thr Ser
 225 230 235 240

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

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

Gly Met Gly Ala Gly Ser Val Ser Val Arg Gly Ile Ala Gly Met Arg
 275 280 285

Lys Ala Met Glu Lys Gly Val Val Val Ile Arg Ser Thr Arg Thr Gly
 290 295 300

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

Ser Leu Asn Pro Ala His Ala Arg Ile Leu Leu Met Leu Ala Leu Thr
 325 330 335

Arg Thr Ser Asp Pro Lys Val Ile Gln Glu Tyr Phe His Thr Tyr
 340 345 350

<210> 50
 <211> 6
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence: Synthetic
 consensus RBS sequence

<400> 50
 aggagg

<210> 51
 <211> 6
 <212> DNA
 <213> Unknown

<220>

<223> Description of Unknown:
RBS2 sequence

<400> 51

ggagcg

6

<210> 52

<211> 6

<212> DNA

<213> Unknown

<220>

<223> Description of Unknown:
RBS34 sequence

<400> 52

ggagcg

6

<210> 53

<211> 6

<212> DNA

<213> Unknown

<220>

<223> Description of Unknown:
RBS41 sequence

<400> 53

aggagt

6

<210> 54

<211> 6

<212> DNA

<213> Unknown

<220>

<223> Description of Unknown:
RBS43 sequence

<400> 54

ggagtg

6

<210> 55

<211> 6

<212> DNA

<213> Unknown

<220>

<223> Description of Unknown:
RBS48 sequence

<400> 55
gagtaa

6

<210> 56
<211> 6
<212> DNA
<213> Unknown

<220>
<223> Description of Unknown:
RBS1 sequence

<400> 56
agagag

6

<210> 57
<211> 6
<212> DNA
<213> Unknown

<220>
<223> Description of Unknown:
RBS35 sequence

<400> 57
aaggca

6

<210> 58
<211> 6
<212> DNA
<213> Unknown

<220>
<223> Description of Unknown:
RBS49 sequence

<400> 58
ccgaac

6

<210> 59
<211> 167
<212> PRT
<213> Pseudomonas fluorescens

<400> 59
Met Arg Lys Leu Thr Gln Leu Val Leu Leu Ala Thr Val Leu Val Thr
1 5 10 15

Thr Pro Ala Phe Ala Glu Met Lys Ile Ala Val Leu Asn Tyr Gln Met
20 25 30

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

Lys Lys Phe Gly Pro Gln Leu Thr Lys Leu Lys Thr Leu Glu Ser Ser
50 55 60

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

Gln Gly Glu Arg Glu Arg Leu Glu Leu Glu Phe Lys Gln Lys Ala Arg
85 90 95

Asp Tyr Gln Phe Gln Ser Lys Glu Leu Asn Glu Ala Lys Ala Val Ala
100 105 110

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

Glu Glu Val Ile Lys Lys Gly Ala Phe Asp Leu Val Phe Glu Arg Gly
130 135 140

Ala Val Ile Asp Val Lys Pro Gln Tyr Asp Ile Thr Arg Gln Val Ile
145 150 155 160

Glu Arg Met Asn Gln Leu Lys
165

<210> 60

<211> 504

<212> DNA

<213> Pseudomonas fluorescens

<400> 60

gtgcgtaagt tgactcaatt ggtcttgctg gccactgtgc tggtcaccac cccggccttc 60

gccgaaatga aaatcgccgt tctgaactat cagatggccc tgctggaatc cgatgcggcc 120

aagcgatacg ccgtggatgc cgagaagaag ttcggtccgc aactgaccaa gctcaagaca 180

ctggaaagca gcgccaaagg catccaggac cgcctggtag ccggtggcga caagatgcag	240
caaggcgagc gcgagcgtct ggagcttgaa ttcaagcaaa aggcccgtga ctaccagttc	300
caatccaagg agctgaacga agccaaggct gtggccgacc gcgaaatgct caagcagctc	360
aagcctaaat tggacagcgc tgtggaagaa gtcataaga agggcgcctt tgacctggtg	420
ttcgagcgtg gcgccgtgat cgacgtcaag cctcaatacg acatcacccg ccaggtgatc	480
gagcgcatga accagctgaa gtga	504

<210> 61

<211> 325

<212> PRT

<213> *Pseudomonas fluorescens*

<400> 61

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

Gly	Met	Gln	Ala	Ser	Ala	Asn	Gly	Leu	Ala	Pro	Ala	Ser	Gly	Phe	Glu
			20					25					30		

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

Phe	Gln	Glu	Met	Ser	Pro	Leu	Ile	Asp	Ser	Ala	Asn	Met	Asn	Pro	Ala
	50					55					60				

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

Cys	Asp	Ala	Val	Leu	Ile	Leu	His	Gly	Thr	Asp	Thr	Leu	Ala	Tyr	Ser
			85						90					95	

Ala	Ala	Ala	Met	Ser	Phe	Gln	Leu	Leu	Gly	Leu	Pro	Ala	Pro	Val	Val
			100					105					110		

Phe	Thr	Gly	Ser	Met	Leu	Pro	Ala	Gly	Val	Pro	Asp	Ser	Asp	Ala	Trp
		115					120					125			

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

Gly Val His Leu Tyr Phe His Gly Ala Leu Met Ala Pro Thr Arg Cys
145 150 155 160

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

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

Arg Asn Asp Lys Ala Pro Ala Asn Val Gly Val Leu Pro Leu Val Pro
195 200 205

Gly Ile Ala Ala Ala Gln Leu Asp Ala Leu Ile Asp Ser Gly Ile Gln
210 215 220

Ala Leu Val Leu Glu Cys Phe Gly Ser Gly Thr Gly Pro Ser Asp Asn
225 230 235 240

Pro Ala Phe Leu Ala Ser Leu Lys Arg Ala Gln Asp Gln Glu Val Val
245 250 255

Val Val Ala Ile Thr Gln Cys His Glu Gly Gly Val Glu Leu Asp Val
260 265 270

Tyr Glu Ala Gly Ser Arg Leu Arg Ser Val Gly Val Leu Ser Gly Gly
275 280 285

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

Ala Gly Leu Asp Ser Ala Glu Ile Arg Arg Leu Val Glu Leu Asp Leu
305 310 315 320

Cys Gly Glu Leu Ser
325

<210> 62

<211> 362

<212> PRT

<213> Pseudomonas fluorescens

<400> 62

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

Leu Leu Phe Pro Val Ala Ala Gln Ala Lys Glu Val Glu Ser Lys Thr
20 25 30

Lys Leu Ser Asn Val Val Ile Leu Ala Thr Gly Gly Thr Ile Ala Gly
35 40 45

Ala Gly Ala Ser Ala Ala Asn Ser Ala Thr Tyr Gln Ala Ala Lys Val
50 55 60

Gly Ile Glu Gln Leu Ile Ala Gly Val Pro Glu Leu Ser Gln Ile Ala
65 70 75 80

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

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

Asn Lys Asp Val Asp Gly Ile Val Ile Thr His Gly Thr Asp Thr Leu
115 120 125

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

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

Gly Met Leu Asn Leu Tyr Asn Ala Val Ala Val Ala Gly Ser Lys Glu
165 170 175

Ala Arg Gly Lys Gly Val Leu Val Thr Met Asn Asp Glu Ile Gln Ser
180 185 190

Gly Arg Asp Val Ser Lys Met Ile Asn Ile Lys Thr Glu Ala Phe Lys
195 200 205

Ser Pro Trp Gly Pro Met Gly Met Val Val Glu Gly Lys Ser Tyr Trp

210

215

220

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

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

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

Ala Ile Ile His Ala Gly Thr Gly Asn Gly Ser Val Ser Ser Lys Val
 275 280 285

Val Pro Ala Leu Val Glu Leu Arg Lys Gln Gly Val Gln Ile Ile Arg
 290 295 300

Ser Ser His Val Asn Ala Gly Gly Met Val Leu Arg Asn Ala Glu Gln
 305 310 315 320

Pro Asp Asp Lys Tyr Asp Trp Val Ala Ala Leu Asp Leu Asn Pro Gln
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Lys Ala Arg Ile Leu Ala Met Val Ala Leu Thr Lys Thr Gln Asp Ser
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Lys Glu Leu Gln Arg Ile Phe Trp Glu Tyr
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<223> Description of Artificial Sequence: Synthetic
 polynucleotide

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