

SEQUENCE LISTING

<110> King Faisal Specialist Hospital & Research Centre
 <120> Fluorescent proteins with increased activity in cells
 <130> K30386PCT
 <160> 11
 <170> PatentIn version 3.5
 <210> 1
 <211> 213
 <212> PRT
 <213> Artificial Sequence
 <220>
 <223> consensus sequence of 6 different GFPs
 <400> 1

Met Lys Ile Lys Leu Arg Met Glu Gly Ser Val Asn Gly His Lys Phe
 1 5 10 15

Ser Ile Glu Gly Glu Gly Lys Gly Lys Pro Tyr Glu Gly Lys Gln Thr
 20 25 30

Met Asn Leu Lys Val Thr Lys Gly Gly Pro Leu Pro Phe Ser Phe Asp
 35 40 45

Ile Leu Ser Thr Val Phe Gln Tyr Gly Asn Arg Cys Phe Thr Lys Tyr
 50 55 60

Pro Asp Asp Ile Pro Asp Tyr Phe Lys Gln Ala Phe Pro Glu Gly Tyr
 65 70 75 80

Ser Trp Glu Arg Thr Met Thr Phe Glu Asp Gly Gly Ile Val Lys Val
 85 90 95

Ser Ser Asp Ile Ser Leu Glu Glu Asp Cys Phe Val Tyr Lys Ile Arg
 100 105 110

Phe Asp Gly Val Asn Phe Pro Ala Asn Gly Pro Val Met Gln Lys Lys
 115 120 125

Thr Leu Lys Trp Glu Pro Ser Thr Glu Lys Met Tyr Val Arg Asp Gly
 130 135 140

Val Leu Lys Gly Asp Val Lys Met Ala Leu Leu Leu Glu Gly Gly Gly
 145 150 155 160

His Tyr Arg Cys Asp Phe Lys Thr Thr Tyr Lys Ala Lys Lys Val Val

165

170

175

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

His Asp Lys Asp Tyr Asn Lys Val Lys Leu Tyr Glu His Ala Val Ala
 195 200 205

His Val Ser Leu Leu
 210

<210> 2
 <211> 219
 <212> PRT
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<220>
 <223> consensus sequence of 26 different GFPs

<220>
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 <222> (2)..(2)
 <223> Xaa can be any naturally occurring amino acid

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<220>
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<222> (218)..(218)

<223> Xaa can be any naturally occurring amino acid

<400> 2

Met Xaa Val Ile Xaa Xaa Met Lys Ile Lys Leu Arg Met Glu Gly Xaa
1 5 10 15

Val Asn Gly His Lys Phe Ser Ile Glu Gly Glu Gly Xaa Gly Xaa Pro
20 25 30

Tyr Glu Gly Lys Gln Thr Met Xaa Leu Xaa Val Thr Lys Gly Gly Pro
35 40 45

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

Arg Xaa Phe Thr Lys Tyr Pro Asp Asp Ile Pro Asp Tyr Phe Lys Gln
65 70 75 80

Ala Phe Pro Glu Gly Tyr Ser Trp Glu Arg Thr Met Xaa Phe Glu Asp
85 90 95

Gly Gly Ile Val Xaa Val Ser Ser Asp Ile Ser Leu Glu Xaa Asp Cys
100 105 110

Phe Val Tyr Lys Ile Arg Phe Xaa Gly Val Asn Phe Pro Ala Asn Gly
115 120 125

Pro Val Met Gln Lys Lys Thr Leu Lys Trp Glu Pro Ser Xaa Glu Lys
130 135 140

Met Tyr Val Xaa Asp Gly Val Leu Lys Gly Asp Val Lys Met Ala Leu
145 150 155 160

Leu Leu Glu Gly Gly Gly His Tyr Arg Cys Asp Phe Lys Thr Xaa Tyr
165 170 175

Lys Ala Xaa Lys Val Val Xaa Leu Pro Asp Tyr His Phe Val Asp His
180 185 190

Arg Ile Glu Ile Thr Xaa Xaa Asp Xaa Asp Tyr Asn Lys Val Lys Leu
195 200 205

Tyr Glu His Ala Val Ala His Val Ser Xaa Leu
210 215

<210> 3

<211> 221

<212> PRT

<213> Artificial Sequence

<220>

<223> combination of SEQ ID NO: 1 and SEQ ID NO: 2

<400> 3

Met Pro Val Ile Lys Pro Val Met Lys Ile Lys Leu Arg Met Glu Gly
1 5 10 15

Ser Val Asn Gly His Lys Phe Ser Ile Glu Gly Glu Gly Lys Gly Lys
20 25 30

Pro Tyr Phe Gly Lys Gln Thr Met Asn Leu Arg Val Thr Lys Gly Ala
35 40 45

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

Asn Arg Cys Phe Thr Lys Tyr Pro Asp Asp Ile Pro Asp Tyr Phe Lys
65 70 75 80

Gln Ser Phe Pro Glu Gly Tyr Ser Trp Glu Arg Thr Met Thr Phe Glu
85 90 95

Asp Gly Gly Ile Val Lys Ile Arg Ser Asp Ile Ser Leu Glu Glu Asp
100 105 110

Cys Phe Val Tyr Lys Ile Glu Phe Lys Gly Val Asn Phe Pro Ala Asn
115 120 125

Gly Pro Val Met Gln Lys Lys Thr Leu Gly Trp Glu Pro Ser Thr Glu
130 135 140

Lys Met Tyr Met Arg Asp Gly Val Leu Val Gly Asp Val Lys Met Ala
145 150 155 160

Leu Leu Leu Glu Gly Gly Gly His Tyr Arg Cys His Phe Lys Thr Thr
165 170 175

Tyr Lys Ala Lys Lys Val Val Gln Leu Pro Asp Tyr His Phe Val Asp
180 185 190

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

Leu Tyr Glu His Ala Ile Ala His Leu Ser Thr Ile Gly
210 215 220

<210> 4
 <211> 221
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> SEQ ID NO: 3 with S58T, K158T and Q62C

<400> 4

Met Pro Val Ile Lys Pro Val Met Lys Ile Lys Leu Arg Met Glu Gly
 1 5 10 15

Ser Val Asn Gly His Lys Phe Ser Ile Glu Gly Glu Gly Lys Gly Lys
 20 25 30

Pro Tyr Phe Gly Lys Gln Thr Met Asn Leu Arg Val Thr Lys Gly Ala
 35 40 45

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

Asn Arg Cys Phe Thr Lys Tyr Pro Asp Asp Ile Pro Asp Tyr Phe Lys
 65 70 75 80

Gln Ser Phe Pro Glu Gly Tyr Ser Trp Glu Arg Thr Met Thr Phe Glu
 85 90 95

Asp Gly Gly Ile Val Lys Ile Arg Ser Asp Ile Ser Leu Glu Glu Asp
 100 105 110

Cys Phe Val Tyr Lys Ile Glu Phe Lys Gly Val Asn Phe Pro Ala Asn
 115 120 125

Gly Pro Val Met Gln Lys Lys Thr Leu Gly Trp Glu Pro Ser Thr Glu
 130 135 140

Lys Met Tyr Met Arg Asp Gly Val Leu Val Gly Asp Val Thr Met Ala
 145 150 155 160

Leu Leu Leu Glu Gly Gly Gly His Tyr Arg Cys His Phe Lys Thr Thr
 165 170 175

Tyr Lys Ala Lys Lys Val Val Gln Leu Pro Asp Tyr His Phe Val Asp
 180 185 190

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

Leu Tyr Glu His Ala Ile Ala His Leu Ser Thr Ile Gly
 210 215 220

<210> 5
 <211> 23
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> consensus sequence of PEST-containing amino acid fragments of highly unstable genes

<400> 5

Leu Pro Ser Val Asp Glu Glu Ser Pro Glu Asp Ser Pro Glu Ser Pro
 1 5 10 15

Val Ser Glu Glu Gly Thr Asp
 20

<210> 6
 <211> 33
 <212> PRT
 <213> Danio rerio

<400> 6

Arg Asp Val Pro Asp Ala Glu Thr Gln Glu Ser Ser Pro Leu Asn Pro
 1 5 10 15

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

Asp

<210> 7
 <211> 244
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> fusion protein consisting of SEQ ID NO: 4 and SEQ ID NO: 5

<400> 7

Met Pro Val Ile Lys Pro Val Met Lys Ile Lys Leu Arg Met Glu Gly
 1 5 10 15

Ser Val Asn Gly His Lys Phe Ser Ile Glu Gly Glu Gly Lys Gly Lys
 20 25 30

Pro Tyr Phe Gly Lys Gln Thr Met Asn Leu Arg Val Thr Lys Gly Ala
 35 40 45

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

Asn Arg Cys Phe Thr Lys Tyr Pro Asp Asp Ile Pro Asp Tyr Phe Lys
65 70 75 80

Gln Ser Phe Pro Glu Gly Tyr Ser Trp Glu Arg Thr Met Thr Phe Glu
85 90 95

Asp Gly Gly Ile Val Lys Ile Arg Ser Asp Ile Ser Leu Glu Glu Asp
100 105 110

Cys Phe Val Tyr Lys Ile Glu Phe Lys Gly Val Asn Phe Pro Ala Asn
115 120 125

Gly Pro Val Met Gln Lys Lys Thr Leu Gly Trp Glu Pro Ser Thr Glu
130 135 140

Lys Met Tyr Met Arg Asp Gly Val Leu Val Gly Asp Val Thr Met Ala
145 150 155 160

Leu Leu Leu Glu Gly Gly Gly His Tyr Arg Cys His Phe Lys Thr Thr
165 170 175

Tyr Lys Ala Lys Lys Val Val Gln Leu Pro Asp Tyr His Phe Val Asp
180 185 190

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

Leu Tyr Glu His Ala Ile Ala His Leu Ser Thr Ile Gly Leu Pro Ser
210 215 220

Val Asp Glu Glu Ser Pro Glu Asp Ser Pro Glu Ser Pro Val Ser Glu
225 230 235 240

Glu Gly Thr Asp

<210> 8

<211> 254

<212> PRT

<213> Artificial Sequence

<220>

<223> fusion protein consisting of SEQ ID NO: 4 and SEQ ID NO: 6

<400> 8

Met Pro Val Ile Lys Pro Val Met Lys Ile Lys Leu Arg Met Glu Gly
1 5 10 15

Ser Val Asn Gly His Lys Phe Ser Ile Glu Gly Glu Gly Lys Gly Lys
20 25 30

Pro Tyr Phe Gly Lys Gln Thr Met Asn Leu Arg Val Thr Lys Gly Ala
35 40 45

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

Asn Arg Cys Phe Thr Lys Tyr Pro Asp Asp Ile Pro Asp Tyr Phe Lys
65 70 75 80

Gln Ser Phe Pro Glu Gly Tyr Ser Trp Glu Arg Thr Met Thr Phe Glu
85 90 95

Asp Gly Gly Ile Val Lys Ile Arg Ser Asp Ile Ser Leu Glu Glu Asp
100 105 110

Cys Phe Val Tyr Lys Ile Glu Phe Lys Gly Val Asn Phe Pro Ala Asn
115 120 125

Gly Pro Val Met Gln Lys Lys Thr Leu Gly Trp Glu Pro Ser Thr Glu
130 135 140

Lys Met Tyr Met Arg Asp Gly Val Leu Val Gly Asp Val Thr Met Ala
145 150 155 160

Leu Leu Leu Glu Gly Gly Gly His Tyr Arg Cys His Phe Lys Thr Thr
165 170 175

Tyr Lys Ala Lys Lys Val Val Gln Leu Pro Asp Tyr His Phe Val Asp
180 185 190

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

Leu Tyr Glu His Ala Ile Ala His Leu Ser Thr Ile Gly Arg Asp Val
210 215 220

Pro Asp Ala Glu Thr Gln Glu Ser Ser Pro Leu Asn Pro Ala Thr Ala
225 230 235 240

Ile Ser His His Gly Leu Pro Asn Ser Ala Ala Leu Leu Asp
245 250

<210> 9
 <211> 573
 <212> PRT
 <213> Artificial Sequence

 <220>
 <223> fusion protein consisting of firefly luciferase and SEQ ID NO: 5

 <400> 9

Met Glu Asp Ala Lys Asn Ile Lys Lys Gly Pro Ala Pro Phe Tyr Pro
 1 5 10 15

Leu Glu Asp Gly Thr Ala Gly Glu Gln Leu His Lys Ala Met Lys Arg
 20 25 30

Tyr Ala Leu Val Pro Gly Thr Ile Ala Phe Thr Asp Ala His Ile Glu
 35 40 45

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

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

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

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

Glu Leu Leu Asn Ser Met Gly Ile Ser Gln Pro Thr Val Val Phe Val
 115 120 125

Ser Lys Lys Gly Leu Gln Lys Ile Leu Asn Val Gln Lys Lys Leu Pro
 130 135 140

Ile Ile Gln Lys Ile Ile Ile Met Asp Ser Lys Thr Asp Tyr Gln Gly
 145 150 155 160

Phe Gln Ser Met Tyr Thr Phe Val Thr Ser His Leu Pro Pro Gly Phe
 165 170 175

Asn Glu Tyr Asp Phe Val Pro Glu Ser Phe Asp Arg Asp Lys Thr Ile
 180 185 190

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

Ala Leu Pro His Arg Thr Ala Cys Val Arg Phe Ser His Ala Arg Asp
 210 215 220

Pro Ile Phe Gly Asn Gln Ile Ile Pro Asp Thr Ala Ile Leu Ser Val
 225 230 235 240

Val Pro Phe His His Gly Phe Gly Met Phe Thr Thr Leu Gly Tyr Leu
 245 250 255

Ile Cys Gly Phe Arg Val Val Leu Met Tyr Arg Phe Glu Glu Glu Leu
 260 265 270

Phe Leu Arg Ser Leu Gln Asp Tyr Lys Ile Gln Ser Ala Leu Leu Val
 275 280 285

Pro Thr Leu Phe Ser Phe Phe Ala Lys Ser Thr Leu Ile Asp Lys Tyr
 290 295 300

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

Lys Glu Val Gly Glu Ala Val Ala Lys Arg Phe His Leu Pro Gly Ile
 325 330 335

Arg Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Ile Leu Ile Thr
 340 345 350

Pro Glu Gly Asp Asp Lys Pro Gly Ala Val Gly Lys Val Val Pro Phe
 355 360 365

Phe Glu Ala Lys Val Val Asp Leu Asp Thr Gly Lys Thr Leu Gly Val
 370 375 380

Asn Gln Arg Gly Glu Leu Cys Val Arg Gly Pro Met Ile Met Ser Gly
 385 390 395 400

Tyr Val Asn Asn Pro Glu Ala Thr Asn Ala Leu Ile Asp Lys Asp Gly
 405 410 415

Trp Leu His Ser Gly Asp Ile Ala Tyr Trp Asp Glu Asp Glu His Phe
 420 425 430

Phe Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln
 435 440 445

Val Ala Pro Ala Glu Leu Glu Ser Ile Leu Leu Gln His Pro Asn Ile
 450 455 460

Phe Asp Ala Gly Val Ala Gly Leu Pro Asp Asp Asp Ala Gly Glu Leu
465 470 475 480

Pro Ala Ala Val Val Val Leu Glu His Gly Lys Thr Met Thr Glu Lys
485 490 495

Glu Ile Val Asp Tyr Val Ala Ser Gln Val Thr Thr Ala Lys Lys Leu
500 505 510

Arg Gly Gly Val Val Phe Val Asp Glu Val Pro Lys Gly Leu Thr Gly
515 520 525

Lys Leu Asp Ala Arg Lys Ile Arg Glu Ile Leu Ile Lys Ala Lys Lys
530 535 540

Gly Gly Lys Ile Ala Val Leu Pro Ser Val Asp Glu Glu Ser Pro Glu
545 550 555 560

Asp Ser Pro Glu Ser Pro Val Ser Glu Glu Gly Thr Asp
565 570

<210> 10

<211> 583

<212> PRT

<213> Artificial Sequence

<220>

<223> fusion protein consisting of firefly luciferase and SEQ ID NO: 6

<400> 10

Met Glu Asp Ala Lys Asn Ile Lys Lys Gly Pro Ala Pro Phe Tyr Pro
1 5 10 15

Leu Glu Asp Gly Thr Ala Gly Glu Gln Leu His Lys Ala Met Lys Arg
20 25 30

Tyr Ala Leu Val Pro Gly Thr Ile Ala Phe Thr Asp Ala His Ile Glu
35 40 45

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

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

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

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

Glu Leu Leu Asn Ser Met Gly Ile Ser Gln Pro Thr Val Val Phe Val
 115 120 125

Ser Lys Lys Gly Leu Gln Lys Ile Leu Asn Val Gln Lys Lys Leu Pro
 130 135 140

Ile Ile Gln Lys Ile Ile Ile Met Asp Ser Lys Thr Asp Tyr Gln Gly
 145 150 155 160

Phe Gln Ser Met Tyr Thr Phe Val Thr Ser His Leu Pro Pro Gly Phe
 165 170 175

Asn Glu Tyr Asp Phe Val Pro Glu Ser Phe Asp Arg Asp Lys Thr Ile
 180 185 190

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

Ala Leu Pro His Arg Thr Ala Cys Val Arg Phe Ser His Ala Arg Asp
 210 215 220

Pro Ile Phe Gly Asn Gln Ile Ile Pro Asp Thr Ala Ile Leu Ser Val
 225 230 235 240

Val Pro Phe His His Gly Phe Gly Met Phe Thr Thr Leu Gly Tyr Leu
 245 250 255

Ile Cys Gly Phe Arg Val Val Leu Met Tyr Arg Phe Glu Glu Glu Leu
 260 265 270

Phe Leu Arg Ser Leu Gln Asp Tyr Lys Ile Gln Ser Ala Leu Leu Val
 275 280 285

Pro Thr Leu Phe Ser Phe Phe Ala Lys Ser Thr Leu Ile Asp Lys Tyr
 290 295 300

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

Lys Glu Val Gly Glu Ala Val Ala Lys Arg Phe His Leu Pro Gly Ile
 325 330 335

Arg Gln Gly Tyr Gly Leu Thr Glu Thr Thr Ser Ala Ile Leu Ile Thr
 340 345 350

Pro Glu Gly Asp Asp Lys Pro Gly Ala Val Gly Lys Val Val Pro Phe
355 360 365

Phe Glu Ala Lys Val Val Asp Leu Asp Thr Gly Lys Thr Leu Gly Val
370 375 380

Asn Gln Arg Gly Glu Leu Cys Val Arg Gly Pro Met Ile Met Ser Gly
385 390 395 400

Tyr Val Asn Asn Pro Glu Ala Thr Asn Ala Leu Ile Asp Lys Asp Gly
405 410 415

Trp Leu His Ser Gly Asp Ile Ala Tyr Trp Asp Glu Asp Glu His Phe
420 425 430

Phe Ile Val Asp Arg Leu Lys Ser Leu Ile Lys Tyr Lys Gly Tyr Gln
435 440 445

Val Ala Pro Ala Glu Leu Glu Ser Ile Leu Leu Gln His Pro Asn Ile
450 455 460

Phe Asp Ala Gly Val Ala Gly Leu Pro Asp Asp Asp Ala Gly Glu Leu
465 470 475 480

Pro Ala Ala Val Val Val Leu Glu His Gly Lys Thr Met Thr Glu Lys
485 490 495

Glu Ile Val Asp Tyr Val Ala Ser Gln Val Thr Thr Ala Lys Lys Leu
500 505 510

Arg Gly Gly Val Val Phe Val Asp Glu Val Pro Lys Gly Leu Thr Gly
515 520 525

Lys Leu Asp Ala Arg Lys Ile Arg Glu Ile Leu Ile Lys Ala Lys Lys
530 535 540

Gly Gly Lys Ile Ala Val Arg Asp Val Pro Asp Ala Glu Thr Gln Glu
545 550 555 560

Ser Ser Pro Leu Asn Pro Ala Thr Ala Ile Ser His His Gly Leu Pro
565 570 575

Asn Ser Ala Ala Leu Leu Asp
580

<210> 11

<211> 239

<212> PRT

<213> Artificial Sequence

<220>

<223> enhanced green fluorescent protein (EGFP)

<400> 11

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

Val Glu Leu Asp Gly Asp Val Asn Gly His Lys Phe Ser Val Ser Gly
 20 25 30

Glu Gly Glu Gly Asp Ala Thr Tyr Gly Lys Leu Thr Leu Lys Phe Ile
 35 40 45

Cys Thr Thr Gly Lys Leu Pro Val Pro Trp Pro Thr Leu Val Thr Thr
 50 55 60

Leu Thr Tyr Gly Val Gln Cys Phe Ser Arg Tyr Pro Asp His Met Lys
 65 70 75 80

Gln His Asp Phe Phe Lys Ser Ala Met Pro Glu Gly Tyr Val Gln Glu
 85 90 95

Arg Thr Ile Phe Phe Lys Asp Asp Gly Asn Tyr Lys Thr Arg Ala Glu
 100 105 110

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

Ile Asp Phe Lys Glu Asp Gly Asn Ile Leu Gly His Lys Leu Glu Tyr
 130 135 140

Asn Tyr Asn Ser His Asn Val Tyr Ile Met Ala Asp Lys Gln Lys Asn
 145 150 155 160

Gly Ile Lys Val Asn Phe Lys Ile Arg His Asn Ile Glu Asp Gly Ser
 165 170 175

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

Pro Val Leu Leu Pro Asp Asn His Tyr Leu Ser Thr Gln Ser Ala Leu
 195 200 205

Ser Lys Asp Pro Asn Glu Lys Arg Asp His Met Val Leu Leu Glu Phe
 210 215 220

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