

720755_ST25
SEQUENCE LISTING

<110> The United States of America, as represented by the
Secretary, Department of Health and Human Services

<120> CHIMERIC ANTIGEN RECEPTORS TARGETING CD-19

<130> 720755

<150> US 62/006,313

<151> 2014-06-02

<160> 15

<170> PatentIn version 3.5

<210> 1

<211> 502

<212> PRT

<213> Artificial sequence

<220>

<223> Synthetic

<400> 1

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1 5 10 15

His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
100 105 110

Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
115 120 125

Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
130 135 140

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

Pro Gly Ser Ser Val Lys Val Ser Cys Lys Asp Ser Gly Gly Thr Phe
165 170 175

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Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
180 185 190

Glu Trp Met Gly Gly Ile Ile Pro Ile Phe Gly Thr Thr Asn Tyr Ala
195 200 205

Gln Gln Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser
210 215 220

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
225 230 235 240

Tyr Tyr Cys Ala Arg Glu Ala Val Ala Ala Asp Trp Leu Asp Pro Trp
245 250 255

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Phe Val Pro Val Phe Leu
260 265 270

Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala
275 280 285

Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg
290 295 300

Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys
305 310 315 320

Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly Val Leu Leu
325 330 335

Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg Asn Arg Ser Lys
340 345 350

Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met Thr Pro Arg Arg
355 360 365

Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala Pro Pro Arg Asp
370 375 380

Phe Ala Ala Tyr Arg Ser Arg Val Lys Phe Ser Arg Ser Ala Asp Ala
385 390 395 400

Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu
405 410 415

Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys Arg Arg Gly Arg Asp
420 425 430

Pro Glu Met Gly Gly Lys Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu
435 440 445

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Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile
450 455 460

Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly His Asp Gly Leu Tyr
465 470 475 480

Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr Asp Ala Leu His Met
485 490 495

Gln Ala Leu Pro Pro Arg
500

<210> 2
<211> 508
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 2

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1 5 10 15

His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
100 105 110

Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
115 120 125

Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
130 135 140

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

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Pro Gly Ser Ser Val₁₆₅ Lys Val Ser Cys₁₇₀ Lys Asp Ser Gly Gly Thr₁₇₅ Phe
 Ser Ser Tyr Ala₁₈₀ Ile Ser Trp Val Arg₁₈₅ Gln Ala Pro Gly Gln₁₉₀ Gly Leu
 Glu Trp Met₁₉₅ Gly Gly Ile Ile Pro₂₀₀ Ile Phe Gly Thr Thr₂₀₅ Asn Tyr Ala
 Gln Gln₂₁₀ Phe Gln Gly Arg Val₂₁₅ Thr Ile Thr Ala Asp₂₂₀ Glu Ser Thr Ser
 Thr₂₂₅ Ala Tyr Met Glu Leu₂₃₀ Ser Ser Leu Arg Ser₂₃₅ Glu Asp Thr Ala Val₂₄₀
 Tyr Tyr Cys Ala Arg₂₄₅ Glu Ala Val Ala₂₅₀ Ala Asp Trp Leu Asp Pro₂₅₅ Trp
 Gly Gln Gly Thr₂₆₀ Leu Val Thr Val Ser₂₆₅ Ser Phe Val Pro Val₂₇₀ Phe Leu
 Pro Ala Lys₂₇₅ Pro Thr Thr Thr Pro₂₈₀ Ala Pro Arg Pro Pro₂₈₅ Thr Pro Ala
 Pro Thr₂₉₀ Ile Ala Ser Gln Pro₂₉₅ Leu Ser Leu Arg Pro₃₀₀ Glu Ala Cys Arg
 Pro₃₀₅ Ala Ala Gly Gly Ala₃₁₀ Val His Thr Arg Gly₃₁₅ Leu Asp Phe Ala Cys₃₂₀
 Asp Ile Tyr Ile Trp₃₂₅ Ala Pro Leu Ala Gly₃₃₀ Thr Cys Gly Val Leu₃₃₅ Leu
 Leu Ser Leu Val₃₄₀ Ile Thr Leu Tyr Cys₃₄₅ Asn His Arg Asn Arg₃₅₀ Phe Ser
 Val Val Lys₃₅₅ Arg Gly Arg Lys Lys₃₆₀ Leu Leu Tyr Ile Phe₃₆₅ Lys Gln Pro
 Phe Met₃₇₀ Arg Pro Val Gln Thr₃₇₅ Thr Gln Glu Glu Asp₃₈₀ Gly Cys Ser Cys
 Arg₃₈₅ Phe Pro Glu Glu Glu₃₉₀ Glu Gly Gly Cys Glu₃₉₅ Leu Arg Val Lys Phe₄₀₀
 Ser Arg Ser Ala Asp₄₀₅ Ala Pro Ala Tyr Gln₄₁₀ Gln Gly Gln Asn Gln₄₁₅ Leu
 Tyr Asn Glu Leu₄₂₀ Asn Leu Gly Arg Arg₄₂₅ Glu Glu Tyr Asp Val₄₃₀ Leu Asp

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Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys
 435 440 445

Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala
 450 455 460

Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys
 465 470 475 480

Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr
 485 490 495

Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
 500 505

<210> 3
 <211> 509
 <212> PRT
 <213> Artificial sequence

<220>
 <223> Synthetic

<400> 3

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
 1 5 10 15

His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
 20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
 35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
 50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
 65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
 85 90 95

Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
 100 105 110

Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
 115 120 125

Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
 130 135 140

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

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Pro Gly Ser Ser Val₁₆₅ Lys Val Ser Cys Lys₁₇₀ Asp Ser Gly Gly Thr Phe
 Ser Ser Tyr Ala₁₈₀ Ile Ser Trp Val Arg₁₈₅ Gln Ala Pro Gly Gln₁₉₀ Gly Leu
 Glu Trp Met₁₉₅ Gly Gly Ile Ile Pro₂₀₀ Ile Phe Gly Thr Thr₂₀₅ Asn Tyr Ala
 Gln Gln₂₁₀ Phe Gln Gly Arg Val₂₁₅ Thr Ile Thr Ala Asp₂₂₀ Glu Ser Thr Ser
 Thr₂₂₅ Ala Tyr Met Glu Leu₂₃₀ Ser Ser Leu Arg Ser₂₃₅ Glu Asp Thr Ala Val₂₄₀
 Tyr Tyr Cys Ala Arg₂₄₅ Glu Ala Val Ala₂₅₀ Asp Trp Leu Asp Pro₂₅₅ Trp
 Gly Gln Gly Thr₂₆₀ Leu Val Thr Val Ser₂₆₅ Ser Phe Val Pro Val₂₇₀ Phe Leu
 Pro Ala Lys₂₇₅ Pro Thr Thr Thr Pro₂₈₀ Ala Pro Arg Pro₂₈₅ Thr Pro Ala
 Pro Thr₂₉₀ Ile Ala Ser Gln Pro₂₉₅ Leu Ser Leu Arg Pro₃₀₀ Glu Ala Cys Arg
 Pro₃₀₅ Ala Ala Gly Gly Ala₃₁₀ Val His Thr Arg Gly₃₁₅ Leu Asp Phe Ala Cys₃₂₀
 Asp Ile Tyr Ile Trp₃₂₅ Ala Pro Leu Ala Gly₃₃₀ Thr Cys Gly Val Leu₃₃₅ Leu
 Leu Ser Leu Val₃₄₀ Ile Thr Leu Tyr Cys₃₄₅ Asn His Arg Asn Gln₃₅₀ Arg Arg
 Lys Tyr Arg₃₅₅ Ser Asn Lys Gly Glu₃₆₀ Ser Pro Val Glu Pro₃₆₅ Ala Glu Pro
 Cys Arg₃₇₀ Tyr Ser Cys Pro Arg₃₇₅ Glu Glu Glu Gly Ser₃₈₀ Thr Ile Pro Ile
 Gln₃₈₅ Glu Asp Tyr Arg Lys₃₉₀ Pro Glu Pro Ala Cys₃₉₅ Ser Pro Arg Val Lys₄₀₀
 Phe Ser Arg Ser Ala₄₀₅ Asp Ala Pro Ala Tyr₄₁₀ Gln Gln Gly Gln Asn₄₁₅ Gln
 Leu Tyr Asn Glu₄₂₀ Leu Asn Leu Gly Arg₄₂₅ Arg Glu Glu Tyr Asp₄₃₀ Val Leu

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Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg
435 440 445

Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met
450 455 460

Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly
465 470 475 480

Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp
485 490 495

Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
500 505

<210> 4
<211> 550
<212> PRT
<213> Artificial sequence

<220>
<223> Synthetic

<400> 4

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1 5 10 15

His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
100 105 110

Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
115 120 125

Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
130 135 140

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Thr Lys Gly Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
 145 150 155 160
 Pro Gly Ser Ser Val Lys Val Ser Cys Lys Asp Ser Gly Gly Thr Phe
 165 170 175
 Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
 180 185 190
 Glu Trp Met Gly Gly Ile Ile Pro Ile Phe Gly Thr Thr Asn Tyr Ala
 195 200 205
 Gln Gln Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser
 210 215 220
 Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
 225 230 235 240
 Tyr Tyr Cys Ala Arg Glu Ala Val Ala Ala Asp Trp Leu Asp Pro Trp
 245 250 255
 Gly Gln Gly Thr Leu Val Thr Val Ser Ser Phe Val Pro Val Phe Leu
 260 265 270
 Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala
 275 280 285
 Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg
 290 295 300
 Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys
 305 310 315 320
 Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly Val Leu Leu
 325 330 335
 Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg Asn Arg Ser Lys
 340 345 350
 Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met Thr Pro Arg Arg
 355 360 365
 Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala Pro Pro Arg Asp
 370 375 380
 Phe Ala Ala Tyr Arg Ser Gln Arg Arg Lys Tyr Arg Ser Asn Lys Gly
 385 390 395 400
 Glu Ser Pro Val Glu Pro Ala Glu Pro Cys Arg Tyr Ser Cys Pro Arg
 405 410 415

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Glu Glu Glu Gly Ser Thr Ile Pro Ile Gln Glu Asp Tyr Arg Lys Pro
420 425 430

Glu Pro Ala Cys Ser Pro Arg Val Lys Phe Ser Arg Ser Ala Asp Ala
435 440 445

Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu
450 455 460

Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys Arg Arg Gly Arg Asp
465 470 475 480

Pro Glu Met Gly Gly Lys Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu
485 490 495

Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile
500 505 510

Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly His Asp Gly Leu Tyr
515 520 525

Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr Asp Ala Leu His Met
530 535 540

Gln Ala Leu Pro Pro Arg
545 550

<210> 5
<211> 556
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<213> Artificial Sequence

<220>
<223> Synthetic

<400> 5

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
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His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

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Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
 100 105 110
 Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
 115 120 125
 Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
 130 135 140
 Thr Lys Gly Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
 145 150 155 160
 Pro Gly Ser Ser Val Lys Val Ser Cys Lys Asp Ser Gly Gly Thr Phe
 165 170 175
 Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
 180 185 190
 Glu Trp Met Gly Gly Ile Ile Pro Ile Phe Gly Thr Thr Asn Tyr Ala
 195 200 205
 Gln Gln Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser
 210 215 220
 Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
 225 230 235 240
 Tyr Tyr Cys Ala Arg Glu Ala Val Ala Ala Asp Trp Leu Asp Pro Trp
 245 250 255
 Gly Gln Gly Thr Leu Val Thr Val Ser Ser Phe Val Pro Val Phe Leu
 260 265 270
 Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala
 275 280 285
 Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg
 290 295 300
 Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys
 305 310 315 320
 Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly Val Leu Leu
 325 330 335
 Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg Asn Gln Arg Arg
 340 345 350
 Lys Tyr Arg Ser Asn Lys Gly Glu Ser Pro Val Glu Pro Ala Glu Pro
 355 360 365

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Cys Arg Tyr Ser Cys Pro Arg Glu Glu Glu Gly Ser Thr Ile Pro Ile
370 375 380

Gln Glu Asp Tyr Arg Lys Pro Glu Pro Ala Cys Ser Pro Arg Phe Ser
385 390 395 400

Val Val Lys Arg Gly Arg Lys Lys Leu Leu Tyr Ile Phe Lys Gln Pro
405 410 415

Phe Met Arg Pro Val Gln Thr Thr Gln Glu Glu Asp Gly Cys Ser Cys
420 425 430

Arg Phe Pro Glu Glu Glu Glu Gly Gly Cys Glu Leu Arg Val Lys Phe
435 440 445

Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu
450 455 460

Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp
465 470 475 480

Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys
485 490 495

Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala
500 505 510

Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys
515 520 525

Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr
530 535 540

Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
545 550 555

<210> 6
<211> 506
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 6

Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
1 5 10 15

Ala Phe Leu Leu Ile Pro Asp Ile Gln Met Thr Gln Thr Thr ser ser
20 25 30

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Leu Ser Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser
 35 40 45
 Gln Asp Ile Ser Lys Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly
 50 55 60
 Thr Val Lys Leu Leu Ile Tyr His Thr Ser Arg Leu His Ser Gly Val
 65 70 75 80
 Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr
 85 90 95
 Ile Ser Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln
 100 105 110
 Gly Asn Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
 115 120 125
 Thr Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
 130 135 140
 Thr Lys Gly Glu Val Lys Leu Gln Glu Ser Gly Pro Gly Leu Val Ala
 145 150 155 160
 Pro Ser Gln Ser Leu Ser Val Thr Cys Thr Val Ser Gly Val Ser Leu
 165 170 175
 Pro Asp Tyr Gly Val Ser Trp Ile Arg Gln Pro Pro Arg Lys Gly Leu
 180 185 190
 Glu Trp Leu Gly Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser
 195 200 205
 Ala Leu Lys Ser Arg Leu Thr Ile Ile Lys Asp Asn Ser Lys Ser Gln
 210 215 220
 Val Phe Leu Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala Ile Tyr
 225 230 235 240
 Tyr Cys Ala Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
 245 250 255
 Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ala Ala Phe Val
 260 265 270
 Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro
 275 280 285
 Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro
 290 295 300

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Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu
305 310 315 320

Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys
325 330 335

Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg
340 345 350

Asn Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met
355 360 365

Thr Pro Arg Arg Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala
370 375 380

Pro Pro Arg Asp Phe Ala Ala Tyr Arg Ser Arg Val Lys Phe Ser Arg
385 390 395 400

Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu Tyr Asn
405 410 415

Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys Arg
420 425 430

Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys Asn Pro
435 440 445

Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu Ala
450 455 460

Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly His
465 470 475 480

Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr Asp
485 490 495

Ala Leu His Met Gln Ala Leu Pro Pro Arg
500 505

<210> 7

<211> 560

<212> PRT

<213> Artificial sequence

<220>

<223> synthetic

<400> 7

Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
1 5 10 15

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

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Leu Ser Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser
 35 40 45
 Gln Asp Ile Ser Lys Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly
 50 55 60
 Thr Val Lys Leu Leu Ile Tyr His Thr Ser Arg Leu His Ser Gly Val
 65 70 75 80
 Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr
 85 90 95
 Ile Ser Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln
 100 105 110
 Gly Asn Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
 115 120 125
 Thr Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
 130 135 140
 Thr Lys Gly Glu Val Lys Leu Gln Glu Ser Gly Pro Gly Leu Val Ala
 145 150 155 160
 Pro Ser Gln Ser Leu Ser Val Thr Cys Thr Val Ser Gly Val Ser Leu
 165 170 175
 Pro Asp Tyr Gly Val Ser Trp Ile Arg Gln Pro Pro Arg Lys Gly Leu
 180 185 190
 Glu Trp Leu Gly Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser
 195 200 205
 Ala Leu Lys Ser Arg Leu Thr Ile Ile Lys Asp Asn Ser Lys Ser Gln
 210 215 220
 Val Phe Leu Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala Ile Tyr
 225 230 235 240
 Tyr Cys Ala Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
 245 250 255
 Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ala Ala Phe Val
 260 265 270
 Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro
 275 280 285
 Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro
 290 295 300

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Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu
 305 310 315 320
 Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys
 325 330 335
 Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg
 340 345 350
 Asn Gln Arg Arg Lys Tyr Arg Ser Asn Lys Gly Glu Ser Pro Val Glu
 355 360 365
 Pro Ala Glu Pro Cys Arg Tyr Ser Cys Pro Arg Glu Glu Glu Gly Ser
 370 375 380
 Thr Ile Pro Ile Gln Glu Asp Tyr Arg Lys Pro Glu Pro Ala Cys Ser
 385 390 395 400
 Pro Arg Phe Ser Val Val Lys Arg Gly Arg Lys Lys Leu Leu Tyr Ile
 405 410 415
 Phe Lys Gln Pro Phe Met Arg Pro Val Gln Thr Thr Gln Glu Glu Asp
 420 425 430
 Gly Cys Ser Cys Arg Phe Pro Glu Glu Glu Glu Gly Gly Cys Glu Leu
 435 440 445
 Arg Val Lys Phe Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly
 450 455 460
 Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr
 465 470 475 480
 Asp Val Leu Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys
 485 490 495
 Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys
 500 505 510
 Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg
 515 520 525
 Arg Arg Gly Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala
 530 535 540
 Thr Lys Asp Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
 545 550 555 560

<210> 8
 <211> 513

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<212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<400> 8

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

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Tyr Cys Ala Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
 245 250 255
 Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ala Ala Phe Val
 260 265 270
 Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro
 275 280 285
 Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro
 290 295 300
 Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu
 305 310 315 320
 Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys
 325 330 335
 Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg
 340 345 350
 Asn Gln Arg Arg Lys Tyr Arg Ser Asn Lys Gly Glu Ser Pro Val Glu
 355 360 365
 Pro Ala Glu Pro Cys Arg Tyr Ser Cys Pro Arg Glu Glu Glu Gly Ser
 370 375 380
 Thr Ile Pro Ile Gln Glu Asp Tyr Arg Lys Pro Glu Pro Ala Cys Ser
 385 390 395 400
 Pro Arg Val Lys Phe Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln
 405 410 415
 Gly Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu
 420 425 430
 Tyr Asp Val Leu Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly
 435 440 445
 Lys Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln
 450 455 460
 Lys Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu
 465 470 475 480
 Arg Arg Arg Gly Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr
 485 490 495
 Ala Thr Lys Asp Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro
 500 505 510

Arg

<210> 9
 <211> 554
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Synthetic

<400> 9

Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
 1 5 10 15

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

Leu Ser Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser
 35 40 45

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

Thr Val Lys Leu Leu Ile Tyr His Thr Ser Arg Leu His Ser Gly Val
 65 70 75 80

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

Ile Ser Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln
 100 105 110

Gly Asn Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
 115 120 125

Thr Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
 130 135 140

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

Pro Ser Gln Ser Leu Ser Val Thr Cys Thr Val Ser Gly Val Ser Leu
 165 170 175

Pro Asp Tyr Gly Val Ser Trp Ile Arg Gln Pro Pro Arg Lys Gly Leu
 180 185 190

Glu Trp Leu Gly Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser
 195 200 205

Ala Leu Lys Ser Arg Leu Thr Ile Ile Lys Asp Asn Ser Lys Ser Gln
 210 215 220

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Val Phe Leu Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala Ile Tyr
 225 230 235 240
 Tyr Cys Ala Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
 245 250 255
 Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ala Ala Phe Val
 260 265 270
 Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro
 275 280 285
 Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro
 290 295 300
 Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu
 305 310 315 320
 Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys
 325 330 335
 Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg
 340 345 350
 Asn Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met
 355 360 365
 Thr Pro Arg Arg Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala
 370 375 380
 Pro Pro Arg Asp Phe Ala Ala Tyr Arg Ser Gln Arg Arg Lys Tyr Arg
 385 390 395 400
 Ser Asn Lys Gly Glu Ser Pro Val Glu Pro Ala Glu Pro Cys Arg Tyr
 405 410 415
 Ser Cys Pro Arg Glu Glu Glu Gly Ser Thr Ile Pro Ile Gln Glu Asp
 420 425 430
 Tyr Arg Lys Pro Glu Pro Ala Cys Ser Pro Arg Val Lys Phe Ser Arg
 435 440 445
 Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu Tyr Asn
 450 455 460
 Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys Arg
 465 470 475 480
 Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys Asn Pro
 485 490 495

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Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu Ala
500 505 510

Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly His
515 520 525

Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr Asp
530 535 540

Ala Leu His Met Gln Ala Leu Pro Pro Arg
545 550

<210> 10
<211> 476
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 10

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1 5 10 15

His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
100 105 110

Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
115 120 125

Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
130 135 140

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

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Pro Gly Ser Ser Val₁₆₅ Lys Val Ser Cys₁₇₀ Lys Asp Ser Gly Gly Thr₁₇₅ Phe
 Ser Ser Tyr Ala₁₈₀ Ile Ser Trp Val Arg₁₈₅ Gln Ala Pro Gly Gln₁₉₀ Gly Leu
 Glu Trp Met₁₉₅ Gly Gly Ile Ile Pro₂₀₀ Ile Phe Gly Thr Thr₂₀₅ Asn Tyr Ala
 Gln Gln₂₁₀ Phe Gln Gly Arg Val₂₁₅ Thr Ile Thr Ala Asp₂₂₀ Glu Ser Thr Ser
 Thr₂₂₅ Ala Tyr Met Glu Leu₂₃₀ Ser Ser Leu Arg Ser₂₃₅ Glu Asp Thr Ala Val₂₄₀
 Tyr Tyr Cys Ala Arg₂₄₅ Glu Ala Val Ala₂₅₀ Ala Asp Trp Leu Asp Pro₂₅₅ Trp
 Gly Gln Gly Thr₂₆₀ Leu Val Thr Val Ser₂₆₅ Ser Phe Val Pro Val₂₇₀ Phe Leu
 Pro Ala Lys₂₇₅ Pro Thr Thr Thr Pro₂₈₀ Ala Pro Arg Pro Pro₂₈₅ Thr Pro Ala
 Pro Thr₂₉₀ Ile Ala Ser Gln Pro₂₉₅ Leu Ser Leu Arg Pro₃₀₀ Glu Ala Cys Arg
 Pro₃₀₅ Ala Ala Gly Gly Ala₃₁₀ Val His Thr Arg Gly₃₁₅ Leu Asp Phe Ala Cys₃₂₀
 Asp Ile Tyr Ile Trp₃₂₅ Ala Pro Leu Ala Gly₃₃₀ Thr Cys Gly Val Leu₃₃₅ Leu
 Leu Ser Leu Val₃₄₀ Ile Thr Leu Tyr Cys₃₄₅ Asn His Arg Asn Arg₃₅₀ Ser Lys
 Arg Ser Arg₃₅₅ Leu Leu His Ser Asp₃₆₀ Tyr Met Asn Met Thr₃₆₅ Pro Arg Arg
 Pro Gly₃₇₀ Pro Thr Arg Lys His₃₇₅ Tyr Gln Pro Tyr Ala₃₈₀ Pro Pro Arg Asp
 Phe₃₈₅ Ala Ala Tyr Arg Ser₃₉₀ Gln Arg Arg Lys Tyr₃₉₅ Arg Ser Asn Lys Gly₄₀₀
 Glu Ser Pro Val Glu₄₀₅ Pro Ala Glu Pro Cys₄₁₀ Arg Tyr Ser Cys Pro₄₁₅ Arg
 Glu Glu Glu Gly₄₂₀ Ser Thr Ile Pro Ile₄₂₅ Gln Glu Asp Tyr Arg₄₃₀ Lys Pro

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Glu Pro Ala Cys Ser Pro Gln Val Arg Lys Ala Ala Ile Thr Ser Tyr
 435 440 445

Glu Lys Ser Asp Gly Val Tyr Thr Gly Leu Ser Thr Arg Asn Gln Glu
 450 455 460

Thr Tyr Glu Thr Leu Lys His Glu Lys Pro Pro Gln
 465 470 475

<210> 11

<211> 480

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic

<400> 11

Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
 1 5 10 15

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

Leu Ser Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser
 35 40 45

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

Thr Val Lys Leu Leu Ile Tyr His Thr Ser Arg Leu His Ser Gly Val
 65 70 75 80

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

Ile Ser Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln
 100 105 110

Gly Asn Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
 115 120 125

Thr Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
 130 135 140

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

Pro Ser Gln Ser Leu Ser Val Thr Cys Thr Val Ser Gly Val Ser Leu
 165 170 175

Pro Asp Tyr Gly Val Ser Trp Ile Arg Gln Pro Pro Arg Lys Gly Leu
 180 185 190

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Glu Trp Leu Gly Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser
 195 200 205
 Ala Leu Lys Ser Arg Leu Thr Ile Ile Lys Asp Asn Ser Lys Ser Gln
 210 215 220
 Val Phe Leu Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala Ile Tyr
 225 230 235 240
 Tyr Cys Ala Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
 245 250 255
 Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ala Ala Phe Val
 260 265 270
 Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro
 275 280 285
 Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro
 290 295 300
 Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu
 305 310 315 320
 Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys
 325 330 335
 Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg
 340 345 350
 Asn Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met
 355 360 365
 Thr Pro Arg Arg Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala
 370 375 380
 Pro Pro Arg Asp Phe Ala Ala Tyr Arg Ser Gln Arg Arg Lys Tyr Arg
 385 390 395 400
 Ser Asn Lys Gly Glu Ser Pro Val Glu Pro Ala Glu Pro Cys Arg Tyr
 405 410 415
 Ser Cys Pro Arg Glu Glu Glu Gly Ser Thr Ile Pro Ile Gln Glu Asp
 420 425 430
 Tyr Arg Lys Pro Glu Pro Ala Cys Ser Pro Gln Val Arg Lys Ala Ala
 435 440 445
 Ile Thr Ser Tyr Glu Lys Ser Asp Gly Val Tyr Thr Gly Leu Ser Thr
 450 455 460

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Arg Asn Gln Glu Thr Tyr Glu Thr Leu Lys His Glu Lys Pro Pro Gln
465 470 475 480

<210> 12
<211> 428
<212> PRT
<213> Artificial sequence

<220>
<223> synthetic

<400> 12

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1 5 10 15

His Ala Ala Arg Pro Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu
20 25 30

Ser Leu Ser Pro Gly Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln
35 40 45

Ser Val Ser Ser Ser Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln
50 55 60

Ala Pro Arg Leu Leu Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile
65 70 75 80

Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr
85 90 95

Ile Ser Arg Leu Glu Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln
100 105 110

Tyr Gly Ser Ser Arg Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile
115 120 125

Lys Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
130 135 140

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

Pro Gly Ser Ser Val Lys Val Ser Cys Lys Asp Ser Gly Gly Thr Phe
165 170 175

Ser Ser Tyr Ala Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu
180 185 190

Glu Trp Met Gly Gly Ile Ile Pro Ile Phe Gly Thr Thr Asn Tyr Ala
195 200 205

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Gln Gln Phe Gln Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser
 210 215 220

Thr Ala Tyr Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val
 225 230 235 240

Tyr Tyr Cys Ala Arg Glu Ala Val Ala Ala Asp Trp Leu Asp Pro Trp
 245 250 255

Gly Gln Gly Thr Leu Val Thr Val Ser Ser Phe Val Pro Val Phe Leu
 260 265 270

Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro Pro Thr Pro Ala
 275 280 285

Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro Glu Ala Cys Arg
 290 295 300

Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu Asp Phe Ala Cys
 305 310 315 320

Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly Val Leu Leu
 325 330 335

Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg Asn Arg Ser Lys
 340 345 350

Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met Thr Pro Arg Arg
 355 360 365

Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala Pro Pro Arg Asp
 370 375 380

Phe Ala Ala Tyr Arg Ser Gln Val Arg Lys Ala Ala Ile Thr Ser Tyr
 385 390 395 400

Glu Lys Ser Asp Gly Val Tyr Thr Gly Leu Ser Thr Arg Asn Gln Glu
 405 410 415

Thr Tyr Glu Thr Leu Lys His Glu Lys Pro Pro Gln
 420 425

<210> 13

<211> 432

<212> PRT

<213> Artificial Sequence

<220>

<223> Synthetic

<400> 13

Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
 1 5 10 15

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

Leu Ser Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Arg Ala Ser
35 40 45

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

Thr Val Lys Leu Leu Ile Tyr His Thr Ser Arg Leu His Ser Gly Val
65 70 75 80

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

Ile Ser Asn Leu Glu Gln Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln
100 105 110

Gly Asn Thr Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
115 120 125

Thr Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser
130 135 140

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

Pro Ser Gln Ser Leu Ser Val Thr Cys Thr Val Ser Gly Val Ser Leu
165 170 175

Pro Asp Tyr Gly Val Ser Trp Ile Arg Gln Pro Pro Arg Lys Gly Leu
180 185 190

Glu Trp Leu Gly Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser
195 200 205

Ala Leu Lys Ser Arg Leu Thr Ile Ile Lys Asp Asn Ser Lys Ser Gln
210 215 220

Val Phe Leu Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala Ile Tyr
225 230 235 240

Tyr Cys Ala Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
245 250 255

Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser Ala Ala Ala Phe Val
260 265 270

Pro Val Phe Leu Pro Ala Lys Pro Thr Thr Thr Pro Ala Pro Arg Pro
275 280 285

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Pro Thr Pro Ala Pro Thr Ile Ala Ser Gln Pro Leu Ser Leu Arg Pro
290 295 300

Glu Ala Cys Arg Pro Ala Ala Gly Gly Ala Val His Thr Arg Gly Leu
305 310 315 320

Asp Phe Ala Cys Asp Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys
325 330 335

Gly Val Leu Leu Leu Ser Leu Val Ile Thr Leu Tyr Cys Asn His Arg
340 345 350

Asn Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met
355 360 365

Thr Pro Arg Arg Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala
370 375 380

Pro Pro Arg Asp Phe Ala Ala Tyr Arg Ser Gln Val Arg Lys Ala Ala
385 390 395 400

Ile Thr Ser Tyr Glu Lys Ser Asp Gly Val Tyr Thr Gly Leu Ser Thr
405 410 415

Arg Asn Gln Glu Thr Tyr Glu Thr Leu Lys His Glu Lys Pro Pro Gln
420 425 430

<210> 14
<211> 18
<212> PRT
<213> Artificial sequence

<220>
<223> synthetic

<400> 14

Gly Ser Thr Ser gly ser gly Lys Pro gly Ser gly Glu gly Ser Thr
1 5 10 15

Lys Gly

<210> 15
<211> 47
<212> PRT
<213> Artificial sequence

<220>
<223> synthetic

<400> 15

Arg Phe Ser Val Val Lys Arg Gly Arg Lys Lys Leu Leu Tyr Ile Phe
1 5 10 15

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Lys Gln Pro Phe Met Arg Pro Val Gln Thr Thr Gln Glu Glu Asp Gly
20 25 30

Cys Ser Cys Arg Phe Pro Glu Glu Glu Glu Gly Gly Cys Glu Leu
35 40 45