

SEQUENCE LISTING

<110> HurraH s.à r.l.

<120> Compositions and Methods for Increasing the Immunoglobulin Binding Capacities of Immunoglobulin-Binding Polypeptides and Oligopeptides

<130> P-AMERSI-013/WO

<150> US 62/432,807

<151> 2016-12-12

<160> 23

<170> PatentIn version 3.5

<210> 1

<211> 524

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 1

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

Ala	Ser	Val	Thr	Leu	Gly	Thr	Leu	Leu	Ile	Ser	Gly	Gly	Val	Thr	Pro
			20					25					30		

Ala	Ala	Asn	Ala	Ala	Gln	His	Asp	Glu	Ala	Gln	Gln	Asn	Ala	Phe	Tyr
		35					40					45			

Gln	Val	Leu	Asn	Met	Pro	Asn	Leu	Asn	Ala	Asp	Gln	Arg	Asn	Gly	Phe
	50					55					60				

Ile	Gln	Ser	Leu	Lys	Asp	Asp	Pro	Ser	Gln	Ser	Ala	Asn	Val	Leu	Gly
65					70					75				80	

Glu	Ala	Gln	Lys	Leu	Asn	Asp	Ser	Gln	Ala	Pro	Lys	Ala	Asp	Ala	Gln
				85					90					95	

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

Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser
115 120 125

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

Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys
145 150 155 160

Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn
165 170 175

Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser
180 185 190

Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln
195 200 205

Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe
210 215 220

Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly
225 230 235 240

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu
245 250 255

Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn
260 265 270

Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu
275 280 285

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

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

Asn Asp Ala Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys Pro Gly Lys

325

330

335

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
 340 345 350

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
 355 360 365

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys
 370 375 380

Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys
 385 390 395 400

Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys
 405 410 415

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly Asn Gly Val His Val
 420 425 430

Val Lys Pro Gly Asp Thr Val Asn Asp Ile Ala Lys Ala Asn Gly Thr
 435 440 445

Thr Ala Asp Lys Ile Ala Ala Asp Asn Lys Leu Ala Asp Lys Asn Met
 450 455 460

Ile Lys Pro Gly Gln Glu Leu Val Val Asp Lys Lys Gln Pro Ala Asn
 465 470 475 480

His Ala Asp Ala Asn Lys Ala Gln Ala Leu Pro Glu Thr Gly Glu Glu
 485 490 495

Asn Pro Phe Ile Gly Thr Thr Val Phe Gly Gly Leu Ser Leu Ala Leu
 500 505 510

Gly Ala Ala Leu Leu Ala Gly Arg Arg Arg Glu Leu
 515 520

<210> 2

<211> 56

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 2

Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr Gln Val Leu Asn
1 5 10 15

Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe Ile Gln Ser Leu
20 25 30

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

Leu Asn Asp Ser Gln Ala Pro Lys
50 55

<210> 3

<211> 61

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 3

Ala Asp Ala Gln Gln Asn Asn Phe Asn Lys Asp Gln Gln Ser Ala Phe
1 5 10 15

Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly
20 25 30

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Thr Asn Val Leu
35 40 45

Gly Glu Ala Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys
50 55 60

<210> 4

<211> 58

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 4

Ala Asp Asn Asn Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile
1 5 10 15

Leu Asn Met Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln
20 25 30

Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu Ser Glu Ala
35 40 45

Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys
50 55

<210> 5

<211> 58

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 5

Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile
1 5 10 15

Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln
20 25 30

Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala
35 40 45

Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys
50 55

<210> 6

<211> 58

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 6

Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile
1 5 10 15

Leu His Leu Pro Asn Leu Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln
20 25 30

Ser Leu Lys Asp Asp Pro Ser Val Ser Lys Glu Ile Leu Ala Glu Ala
35 40 45

Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys
50 55

<210> 7

<211> 197

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 7

Glu Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly
1 5 10 15

Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly
20 25 30

Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly
35 40 45

Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly
50 55 60

Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly
65 70 75 80

Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly
85 90 95

Lys Glu Asp Gly Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val

100

105

110

Asn Asp Ile Ala Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala
 115 120 125

Asp Asn Lys Leu Ala Asp Lys Asn Met Ile Lys Pro Gly Gln Glu Leu
 130 135 140

Val Val Asp Lys Lys Gln Pro Ala Asn His Ala Asp Ala Asn Lys Ala
 145 150 155 160

Gln Ala Leu Pro Glu Thr Gly Glu Glu Asn Pro Phe Ile Gly Thr Thr
 165 170 175

Val Phe Gly Gly Leu Ser Leu Ala Leu Gly Ala Ala Leu Leu Ala Gly
 180 185 190

Arg Arg Arg Glu Leu
 195

<210> 8
 <211> 6
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> The sequence was designed and synthesized.

<400> 8

His Trp Arg Gly Trp Val
 1 5

<210> 9
 <211> 7
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> The sequence was designed and synthesized.

<400> 9

Gln Pro Gln Met Ser His Met
 1 5

<210> 10
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> The sequence was designed and synthesized.

<400> 10

Lys Pro Gly Lys Glu Asp Asn Asn
1 5

<210> 11
<211> 450
<212> PRT
<213> Staphylococcus aureus

<400> 11

Met Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr Gln Val Leu
1 5 10 15

Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe Ile Gln Ser
20 25 30

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

Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala Gln Gln Asn Asn
50 55 60

Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile Leu Asn Met Pro
65 70 75 80

Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp
85 90 95

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

Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys Glu Gln Gln
115 120 125

Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn Glu Glu Gln
130 135 140

Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala
145 150 155 160

Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys
165 170 175

Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile
180 185 190

Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln
195 200 205

Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala
210 215 220

Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn
225 230 235 240

Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu
245 250 255

Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro
260 265 270

Ser Val Ser Lys Glu Ile Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala
275 280 285

Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn
290 295 300

Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn
305 310 315 320

Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Gly
325 330 335

Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly
340 345 350

Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly
355 360 365

Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly
370 375 380

Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val Asn Asp Ile Ala
385 390 395 400

Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala Asp Asn Lys Leu
405 410 415

Ala Asp Lys Asn Met Ile Lys Pro Gly Gln Glu Leu Val Val Asp Lys
420 425 430

Lys Gln Pro Ala Asn His Ala Asp Ala Asn Lys Ala Gln Ala Leu Pro
435 440 445

Glu Thr
450

<210> 12
<211> 470
<212> PRT
<213> Artificial Sequence

<220>
<223> The sequence was designed and synthesized.

<400> 12

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

Thr Val Ala Gln Ala Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe
20 25 30

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

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu
50 55 60

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

Gln Gln Asn Asn Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile
85 90 95

Leu Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln
100 105 110

Ser Leu Lys Asp Asp Pro Ser Gln Ser Thr Asn Val Leu Gly Glu Ala
115 120 125

Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn
130 135 140

Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu
145 150 155 160

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

Ser Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser
180 185 190

Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala
195 200 205

Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn
210 215 220

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

Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp
245 250 255

Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His
260 265 270

Leu Pro Asn Leu Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu
275 280 285

Lys Asp Asp Pro Ser Val Ser Lys Glu Ile Leu Ala Glu Ala Lys Lys
290 295 300

Leu Asn Asp Ala Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys Pro Gly
305 310 315 320

Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly
325 330 335

Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly
340 345 350

Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly
355 360 365

Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly
370 375 380

Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly
385 390 395 400

Lys Glu Asp Gly Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val
405 410 415

Asn Asp Ile Ala Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala
420 425 430

Asp Asn Lys Leu Ala Asp Lys Asn Met Ile Lys Pro Gly Gln Glu Leu
435 440 445

Val Val Asp Lys Lys Gln Pro Ala Asn His Ala Asp Ala Asn Lys Ala
450 455 460

Gln Ala Leu Pro Glu Thr
465 470

<210> 13
<211> 485

<212> PRT
<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 13

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

Ala Ser Val Thr Leu Gly Thr Leu Leu Ile Ser Gly Gly Val Thr Pro
20 25 30

Ala Ala Asn Ala Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr
35 40 45

Gln Val Leu Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe
50 55 60

Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu Gly
65 70 75 80

Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala Gln
85 90 95

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

Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser
115 120 125

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

Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys
145 150 155 160

Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn
165 170 175

Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser
180 185 190

Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln
195 200 205

Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe
210 215 220

Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly
225 230 235 240

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu
245 250 255

Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn
260 265 270

Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu
275 280 285

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

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

Asn Asp Ala Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys Pro Gly Lys
325 330 335

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
340 345 350

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
355 360 365

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys
370 375 380

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys
385 390 395 400

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys
405 410 415

Glu Asp Gly Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val Asn
420 425 430

Asp Ile Ala Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala Asp
435 440 445

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

Val Asp Lys Lys Gln Pro Ala Asn His Ala Asp Ala Asn Lys Ala Gln
465 470 475 480

Ala Leu Pro Glu Thr
485

<210> 14
<211> 415
<212> PRT
<213> Artificial Sequence

<220>
<223> The sequence was designed and synthesized.

<400> 14

Met Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr Gln Val Leu
1 5 10 15

Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe Ile Gln Ser
20 25 30

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

Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala Gln Gln Asn Asn
50 55 60

Phe Asn Lys Asp Gln Gln Ser Ala Phe Tyr Glu Ile Leu Asn Met Pro
65 70 75 80

Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp
85 90 95

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

Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys Glu Gln Gln
115 120 125

Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn Glu Glu Gln
130 135 140

Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala
145 150 155 160

Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln Ala Pro Lys
165 170 175

Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile
180 185 190

Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly Phe Ile Gln
195 200 205

Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu Ala Glu Ala
210 215 220

Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn Lys Phe Asn
225 230 235 240

Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu
245 250 255

Thr Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro
260 265 270

Ser Val Ser Lys Glu Ile Leu Ala Glu Ala Lys Lys Leu Asn Asp Ala
275 280 285

Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn
290 295 300

Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn
305 310 315 320

Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Gly
325 330 335

Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly
340 345 350

Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly
355 360 365

Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly
370 375 380

Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val Asn Asp Ile Ala
385 390 395 400

Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala Asp Asn Lys
405 410 415

<210> 15

<211> 450

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 15

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

Ala Ser Val Thr Leu Gly Thr Leu Leu Ile Ser Gly Gly Val Thr Pro
20 25 30

Ala Ala Asn Ala Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr
35 40 45

Gln Val Leu Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe
50 55 60

Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu Gly
65 70 75 80

Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala Gln
85 90 95

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

Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser
115 120 125

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

Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys
145 150 155 160

Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn
165 170 175

Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser
180 185 190

Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln
195 200 205

Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe
210 215 220

Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly
225 230 235 240

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu
245 250 255

Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn
260 265 270

Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu
275 280 285

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

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

Asn Asp Ala Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys Pro Gly Lys
325 330 335

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
340 345 350

Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys
355 360 365

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys
370 375 380

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys
385 390 395 400

Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys
405 410 415

Glu Asp Gly Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val Asn
420 425 430

Asp Ile Ala Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala Asp
435 440 445

Asn Lys
450

<210> 16

<211> 543

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 16

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

Ala Ser Val Thr Leu Gly Thr Leu Leu Ile Ser Gly Gly Val Thr Pro
20 25 30

Ala Ala Asn Ala Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr
35 40 45

Gln Val Leu Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe
50 55 60

Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu Gly
65 70 75 80

Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala Gln
85 90 95

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

Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser
115 120 125

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

Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys
145 150 155 160

Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn
165 170 175

Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser
180 185 190

Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln
195 200 205

Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe
210 215 220

Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly
225 230 235 240

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu
245 250 255

Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn
260 265 270

Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu
275 280 285

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

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

Asn Asp Ala Gln Ala Pro Lys Glu Glu Asp Asn Asn Gly Gly Ser Ser
325 330 335

Arg Ser Ser Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Gln Pro
340 345 350

Gln Met Ser His Met Gly Gly Ser Ser Arg Ser Ser Ser Ser Gly Gly
355 360 365

Gly Gly Ser Gly Gly Gly Gly Gln Pro Gln Met Ser His Met Gly Gly
370 375 380

Ser Ser Arg Ser Ser Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
385 390 395 400

Gln Pro Gln Met Ser His Met Gly Gly Ser Ser Arg Ser Ser Ser Ser
405 410 415

Gly Gly Gly Gly Ser Gly Gly Gly Gly Lys Pro Gly Lys Glu Asp Asn
420 425 430

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

Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Gly
450 455 460

Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly
465 470 475 480

Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys Pro Gly Lys Glu Asp Gly
485 490 495

Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly
500 505 510

Asn Gly Val His Val Val Lys Pro Gly Asp Thr Val Asn Asp Ile Ala
515 520 525

Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile Ala Ala Asp Asn Lys
530 535 540

<210> 17

<211> 533

<212> PRT

<213> Artificial Sequence

<220>

<223> The sequence was designed and synthesized.

<400> 17

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

Ala Ser Val Thr Leu Gly Thr Leu Leu Ile Ser Gly Gly Val Thr Pro
20 25 30

Ala Ala Asn Ala Ala Gln His Asp Glu Ala Gln Gln Asn Ala Phe Tyr
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Gln Val Leu Asn Met Pro Asn Leu Asn Ala Asp Gln Arg Asn Gly Phe
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Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Val Leu Gly
65 70 75 80

Glu Ala Gln Lys Leu Asn Asp Ser Gln Ala Pro Lys Ala Asp Ala Gln
85 90 95

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

Asn Met Pro Asn Leu Asn Glu Ala Gln Arg Asn Gly Phe Ile Gln Ser
115 120 125

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

Lys Leu Asn Glu Ser Gln Ala Pro Lys Ala Asp Asn Asn Phe Asn Lys
145 150 155 160

Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu Asn Met Pro Asn Leu Asn
165 170 175

Glu Glu Gln Arg Asn Gly Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser
180 185 190

Gln Ser Ala Asn Leu Leu Ser Glu Ala Lys Lys Leu Asn Glu Ser Gln
195 200 205

Ala Pro Lys Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe
210 215 220

Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg Asn Gly
225 230 235 240

Phe Ile Gln Ser Leu Lys Asp Asp Pro Ser Gln Ser Ala Asn Leu Leu
245 250 255

Ala Glu Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ala Asp Asn
260 265 270

Lys Phe Asn Lys Glu Gln Gln Asn Ala Phe Tyr Glu Ile Leu His Leu
275 280 285

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

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

Asn Asp Ala Gln Ala Pro Lys Gly Gly Ser Ser Arg Ser Ser Ser Ser
325 330 335

Gly Gly Gly Gly Ser Gly Gly Gly Gly Ala Asp Asn Lys Gln Pro Gln
340 345 350

Met Ser His Met His Leu Pro Asn Leu Asn Glu Gln Pro Gln Met Ser
355 360 365

His Met His Leu Pro Asn Leu Asn Glu Gln Pro Gln Met Ser His Met
370 375 380

His Leu Pro Asn Leu Asn Glu Val Ser Lys Glu Ile Leu Ala Glu Ala
385 390 395 400

Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Glu Glu Asp Asn Asn Lys
405 410 415

Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys
420 425 430

Pro Gly Lys Glu Asp Asn Asn Lys Pro Gly Lys Glu Asp Asn Asn Lys
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Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys
450 455 460

Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Asn Lys Lys
465 470 475 480

Pro Gly Lys Glu Asp Gly Asn Lys Pro Gly Lys Glu Asp Gly Asn Lys
485 490 495

Pro Gly Lys Glu Asp Gly Asn Gly Val His Val Val Lys Pro Gly Asp
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Thr Val Asn Asp Ile Ala Lys Ala Asn Gly Thr Thr Ala Asp Lys Ile
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Ala Ala Asp Asn Lys
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Ser His Leu Ser Lys Asn Phe
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