

Sequence listing

<110> ONEGENE BIOTECHNOLOGY INC.

<120> A multivalent multispecific multimeric biomolecule having prolonged in vivo half-life

<130> OGB20P-0008-WO

<150> KR 10-2019-0154945

<151> 2019-11-27

<160> 29

<170> KoPatentIn 3.0

<210> 1

<211> 76

<212> PRT

<213> Artificial Sequence

<220>

<223> Ubiquitin C-terminal Tag

<400> 1

Met Gln Ile Phe Val Lys Thr Leu Thr Gly Lys Thr Ile Thr Leu Glu

1 5 10 15

Val Glu Pro Ser Asp Thr Ile Glu Asn Val Lys Ala Lys Ile Gln Asp

20 25 30

Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys

35 40 45

Gln Leu Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu

50 55 60

Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Gly

65 70 75

<210> 2

Sequence listing

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

<220>
 <223> Xylose Reductase

<400> 2
 Met Gly His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15

Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30

Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr
 35 40 45

Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
 50 55 60

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

Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
 85 90 95

Val Tyr Gln Glu Gln Thr Gly Gly Met Pro Ser Ile Lys Leu Asn Ser
 100 105 110

Gly Tyr Asp Met Pro Ala Val Gly Phe Gly Cys Trp Lys Val Asp Val
 115 120 125

Asp Thr Cys Ser Glu Gln Ile Tyr Arg Ala Ile Lys Thr Gly Tyr Arg
 130 135 140

Leu Phe Asp Gly Ala Glu Asp Tyr Ala Asn Glu Lys Leu Val Gly Ala
 145 150 155 160

Gly Val Lys Lys Ala Ile Asp Glu Gly Ile Val Lys Arg Glu Asp Leu
 165 170 175

Sequence listing

Phe Leu Thr Ser Lys Leu Trp Asn Asn Tyr His His Pro Asp Asn Val
180 185 190

Glu Lys Ala Leu Asn Arg Thr Leu Ser Asp Leu Gln Val Asp Tyr Val
195 200 205

Asp Leu Phe Leu Ile His Phe Pro Val Thr Phe Lys Phe Val Pro Leu
210 215 220

Glu Glu Lys Tyr Pro Pro Gly Phe Tyr Cys Gly Lys Gly Asp Asn Phe
225 230 235 240

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

Leu Val Lys Ala Gly Lys Ile Arg Ser Ile Gly Val Ser Asn Phe Pro
260 265 270

Gly Ala Leu Leu Leu Asp Leu Leu Arg Gly Ala Thr Ile Lys Pro Ser
275 280 285

Val Leu Gln Val Glu His His Pro Tyr Leu Gln Gln Pro Arg Leu Ile
290 295 300

Glu Phe Ala Gln Ser Arg Gly Ile Ala Val Thr Ala Tyr Ser Ser Phe
305 310 315 320

Gly Pro Gln Ser Phe Val Glu Leu Asn Gln Gly Arg Ala Leu Asn Thr
325 330 335

Ser Pro Leu Phe Glu Asn Glu Thr Ile Lys Ala Ile Ala Ala Lys His
340 345 350

Gly Lys Ser Pro Ala Gln Val Leu Leu Arg Trp Ser Ser Gln Arg Gly
355 360 365

Ile Ala Ile Ile Pro Lys Ser Asn Thr Val Pro His Leu Leu Glu Asn
370 375 380

Lys Asp Val Asn Ser Phe Asp Leu Asp Glu Gln Asp Phe Ala Asp Ile

Sequence listing

385 390 395 400
 Ala Lys Leu Asp Ile Asn Leu Arg Phe Asn Asp Pro Trp Asp Trp Asp
 405 410 415
 Lys Ile Pro Ile Phe Val Gly Gly His His His His His His Met Gln
 420 425 430
 Ile Phe Val Lys Thr Leu Thr Gly Lys Thr Ile Thr Leu Glu Val Glu
 435 440 445
 Pro Ser Asp Thr Ile Glu Asn Val Lys Ala Lys Ile Gln Asp Lys Glu
 450 455 460
 Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu
 465 470 475 480
 Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr
 485 490 495
 Leu His Leu Val Leu Arg Leu Arg Gly Gly
 500 505

<210> 3
 <211> 542
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Xylitol dehydrogenase

<400> 3
 Met Gly His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15
 Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30
 Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr

Sequence listing

35

40

45

Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
50 55 60

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

Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
85 90 95

Val Tyr Gln Glu Gln Thr Gly Gly Met Thr Ala Asn Pro Ser Leu Val
100 105 110

Leu Asn Lys Ile Asp Asp Ile Ser Phe Glu Thr Tyr Asp Ala Pro Glu
115 120 125

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

Cys Gly Ser Asp Ile His Phe Tyr Ala His Gly Arg Ile Gly Asn Phe
145 150 155 160

Val Leu Thr Lys Pro Met Val Leu Gly His Glu Ser Ala Gly Thr Val
165 170 175

Val Gln Val Gly Lys Gly Val Thr Ser Leu Lys Val Gly Asp Asn Val
180 185 190

Ala Ile Glu Pro Gly Ile Pro Ser Arg Phe Ser Asp Glu Tyr Lys Ser
195 200 205

Gly His Tyr Asn Leu Cys Pro His Met Ala Phe Ala Ala Thr Pro Asn
210 215 220

Ser Lys Glu Gly Glu Pro Asn Pro Pro Gly Thr Leu Cys Lys Tyr Phe
225 230 235 240

Lys Ser Pro Glu Asp Phe Leu Val Lys Leu Pro Asp His Val Ser Leu
245 250 255

Sequence listing

Glu Leu Gly Ala Leu Val Glu Pro Leu Ser Val Gly Val His Ala Ser
260 265 270

Lys Leu Gly Ser Val Ala Phe Gly Asp Tyr Val Ala Val Phe Gly Ala
275 280 285

Gly Pro Val Gly Leu Leu Ala Ala Val Ala Lys Thr Phe Gly Ala
290 295 300

Lys Gly Val Ile Val Val Asp Ile Phe Asp Asn Lys Leu Lys Met Ala
305 310 315 320

Lys Asp Ile Gly Ala Ala Thr His Thr Phe Asn Ser Lys Thr Gly Gly
325 330 335

Ser Glu Glu Leu Ile Lys Ala Phe Gly Gly Asn Val Pro Asn Val Val
340 345 350

Leu Glu Cys Thr Gly Ala Glu Pro Cys Ile Lys Leu Gly Val Asp Ala
355 360 365

Ile Ala Pro Gly Gly Arg Phe Val Gln Val Gly Asn Ala Ala Gly Pro
370 375 380

Val Ser Phe Pro Ile Thr Val Phe Ala Met Lys Glu Leu Thr Leu Phe
385 390 395 400

Gly Ser Phe Arg Tyr Gly Phe Asn Asp Tyr Lys Thr Ala Val Gly Ile
405 410 415

Phe Asp Thr Asn Tyr Gln Asn Gly Arg Glu Asn Ala Pro Ile Asp Phe
420 425 430

Glu Gln Leu Ile Thr His Arg Tyr Lys Phe Lys Asp Ala Ile Glu Ala
435 440 445

Tyr Asp Leu Val Arg Ala Gly Lys Gly Ala Val Lys Cys Leu Ile Asp
450 455 460

Gly Pro Glu Met Gln Ile Phe Val Lys Thr Leu Thr Gly Lys Thr Ile
465 470 475 480

Sequence listing

Thr Leu Glu Val Glu Pro Ser Asp Thr Ile Glu Asn Val Lys Ala Lys
 485 490 495

Ile Gln Asp Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe
 500 505 510

Ala Gly Lys Gln Leu Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn Ile
 515 520 525

Gln Lys Glu Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly
 530 535 540

<210> 4

<211> 407

<212> PRT

<213> Artificial Sequence

<220>

<223> Oxaloacetate decarboxylase

<400> 4

Met Gly His His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15

Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30

Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr
 35 40 45

Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
 50 55 60

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

Sequence listing

Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
85 90 95

Val Tyr Gln Glu Gln Thr Gly Gly Met Tyr Glu Leu Gly Val Val Tyr
100 105 110

Arg Asn Ile Gln Arg Ala Asp Arg Ala Ala Ala Asp Gly Leu Ala Ala
115 120 125

Leu Gly Ser Ala Thr Val His Glu Ala Met Gly Arg Val Gly Leu Leu
130 135 140

Lys Pro Tyr Met Arg Pro Ile Tyr Ala Gly Lys Gln Val Ser Gly Thr
145 150 155 160

Ala Val Thr Val Leu Leu Gln Pro Gly Asp Asn Trp Met Met His Val
165 170 175

Ala Ala Glu Gln Ile Gln Pro Gly Asp Ile Val Val Ala Ala Val Thr
180 185 190

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

Gln Ala Arg Gly Ala Arg Ala Leu Ile Ile Asp Ala Gly Val Arg Asp
210 215 220

Val Lys Thr Leu Gln Glu Met Asp Phe Pro Val Trp Ser Lys Ala Ile
225 230 235 240

Ser Ser Lys Gly Thr Ile Lys Ala Thr Leu Gly Ser Val Asn Ile Pro
245 250 255

Ile Val Cys Ala Gly Met Leu Val Thr Pro Gly Asp Val Ile Val Ala
260 265 270

Asp Asp Asp Gly Val Val Cys Val Pro Ala Ala Arg Ala Val Glu Val
275 280 285

Leu Ala Ala Ala Gln Lys Arg Glu Ser Phe Glu Gly Glu Lys Arg Ala
290 295 300

Sequence listing

Lys Leu Ala Ser Gly Val Leu Gly Leu Asp Met Tyr Lys Met Arg Glu
 305 310 315 320

Pro Leu Glu Lys Ala Gly Leu Lys Tyr Ile Asp Met Gln Ile Phe Val
 325 330 335

Lys Thr Leu Thr Gly Lys Thr Ile Thr Leu Glu Val Glu Pro Ser Asp
 340 345 350

Thr Ile Glu Asn Val Lys Ala Lys Ile Gln Asp Lys Glu Gly Ile Pro
 355 360 365

Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly
 370 375 380

Arg Thr Leu Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr Leu His Leu
 385 390 395 400

Val Leu Arg Leu Arg Gly Gly
 405

<210> 5
 <211> 430
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Triose-phosphate isomerase

<400> 5
 Met Gly His His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15

Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30

Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr
 35 40 45

Sequence listing

Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
50 55 60

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

Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
85 90 95

Val Tyr Gln Glu Gln Thr Gly Gly Met Arg Arg Val Leu Val Ala Gly
100 105 110

Asn Trp Lys Met His Lys Thr Pro Ser Glu Ala Arg Val Trp Phe Ala
115 120 125

Glu Leu Lys Arg Leu Leu Pro Pro Leu Gln Ser Glu Ala Ala Val Leu
130 135 140

Pro Ala Phe Pro Ile Leu Pro Val Ala Lys Glu Val Leu Ala Glu Thr
145 150 155 160

Gln Val Gly Tyr Gly Ala Gln Asp Val Ser Ala His Lys Glu Gly Ala
165 170 175

Tyr Thr Gly Glu Val Ser Ala Arg Met Leu Ser Asp Leu Gly Cys Arg
180 185 190

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

Asp Ala Leu Val Ala Glu Lys Ala Lys Arg Leu Leu Glu Glu Gly Ile
210 215 220

Thr Pro Ile Leu Cys Val Gly Glu Pro Leu Glu Val Arg Glu Lys Gly
225 230 235 240

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

Val Glu Pro Pro Gly Pro Glu Ala Leu Val Ile Ala Tyr Glu Pro Val

Sequence listing

260

265

270

Trp Ala Ile Gly Thr Gly Lys Asn Ala Thr Pro Glu Asp Ala Glu Ala
275 280 285

Met His Gln Glu Ile Arg Lys Ala Leu Ser Glu Arg Tyr Gly Glu Ala
290 295 300

Phe Ala Ser Arg Val Arg Ile Leu Tyr Gly Gly Ser Val Asn Pro Lys
305 310 315 320

Asn Phe Ala Asp Leu Leu Ser Met Pro Asn Val Asp Gly Gly Leu Val
325 330 335

Gly Gly Ala Ser Leu Glu Leu Glu Ser Phe Leu Ala Leu Leu Arg Ile
340 345 350

Ala Gly Met Gln Ile Phe Val Lys Thr Leu Thr Gly Lys Thr Ile Thr
355 360 365

Leu Glu Val Glu Pro Ser Asp Thr Ile Glu Asn Val Lys Ala Lys Ile
370 375 380

Gln Asp Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala
385 390 395 400

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

Lys Glu Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Gly
420 425 430

<210> 6
<211> 496
<212> PRT
<213> Artificial Sequence

<220>
<223> Aldolase

Sequence listing

<400> 6
 Met Gly His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15
 Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30
 Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr
 35 40 45
 Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
 50 55 60
 Pro Met Asn Ser Leu Arg Phe Leu Phe Glu Gly Gln Arg Ile Ala Asp
 65 70 75 80
 Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
 85 90 95
 Val Tyr Gln Glu Gln Thr Gly Gly Met Val Thr Met Pro Tyr Val Lys
 100 105 110
 Asn Thr Lys Glu Ile Leu Glu Lys Ala Ser Lys Glu Arg Tyr Ala Ile
 115 120 125
 Gly Ala Phe Asn Phe Asn Asn Met Glu Phe Leu Gln Ala Ile Leu Glu
 130 135 140
 Ala Ala Glu Glu Glu Lys Ala Pro Val Ile Val Ala Thr Ser Glu Gly
 145 150 155 160
 Ala Ile Lys Tyr Ile Gly Lys Gly Asp Ile Glu Thr Gly Ala Lys Leu
 165 170 175
 Ala Val Glu Met Val Arg Thr Tyr Ala Glu Lys Leu Ser Val Pro Val
 180 185 190
 Ala Leu His Leu Asp His Gly Arg Asp Phe Lys Val Ile Met Ala Ala
 195 200 205

Sequence listing

Ile Lys Ala Gly Tyr Ser Ser Val Met Ile Asp Ala Ser His Leu Pro
210 215 220

Phe Glu Glu Asn Leu Arg Glu Thr Lys Arg Ile Val Glu Ile Ala His
225 230 235 240

Ala Val Gly Ile Ser Val Glu Ala Glu Leu Gly Lys Leu Lys Gly Ile
245 250 255

Glu Asp Asn Val Val Glu Lys Glu Ser Val Leu Val Asp Pro Glu Glu
260 265 270

Ala Lys Val Phe Val Lys Glu Thr Glu Val Asp Phe Leu Ala Pro Ala
275 280 285

Ile Gly Thr Ser His Gly Ala Phe Lys Phe Lys Gly Glu Ala Gln Leu
290 295 300

Asp Phe Glu Arg Leu Lys Lys Val Lys Glu Tyr Thr Gln Ile Pro Leu
305 310 315 320

Val Leu His Gly Ala Ser Met Val Pro Gln Asp Ile Val Lys Leu Ala
325 330 335

Asn Glu Tyr Gly Ala Glu Leu Ser Gly Ala Lys Gly Val Pro Glu Asp
340 345 350

Met Leu Lys Lys Ala Ile Glu Leu Gly Ile Asn Lys Ile Asn Thr Asp
355 360 365

Thr Asp Leu Arg Ile Thr Phe Val Ala Tyr Leu Arg Lys Val Leu Ser
370 375 380

Glu Asp Lys Ser Gln Ile Asp Pro Arg Lys Ile Phe Lys Pro Val Phe
385 390 395 400

Glu Gln Val Lys Glu Ile Val Lys Glu Arg Ile Arg Ile Phe Gly Ser
405 410 415

Ser Gly Lys Ala Met Gln Ile Phe Val Lys Thr Leu Thr Gly Lys Thr
420 425 430

Sequence listing

Ile Thr Leu Glu Val Glu Pro Ser Asp Thr Ile Glu Asn Val Lys Ala
 435 440 445

Lys Ile Gln Asp Lys Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile
 450 455 460

Phe Ala Gly Lys Gln Leu Glu Asp Gly Arg Thr Leu Ser Asp Tyr Asn
 465 470 475 480

Ile Gln Lys Glu Ser Thr Leu His Leu Val Leu Arg Leu Arg Gly Gly
 485 490 495

<210> 7

<211> 437

<212> PRT

<213> Artificial Sequence

<220>

<223> Fructose 1,6-bisphosphatase

<400> 7

Met Gly His His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15

Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30

Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr
 35 40 45

Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
 50 55 60

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

Sequence listing

Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
85 90 95

Val Tyr Gln Glu Gln Thr Gly Gly Met Leu Asp Arg Leu Asp Phe Ser
100 105 110

Ile Lys Leu Leu Arg Lys Val Gly His Leu Leu Met Ile His Trp Gly
115 120 125

Arg Val Asp Asn Val Glu Lys Lys Thr Gly Phe Lys Asp Ile Val Thr
130 135 140

Glu Ile Asp Arg Glu Ala Gln Arg Met Ile Val Asp Glu Ile Arg Lys
145 150 155 160

Phe Phe Pro Asp Glu Asn Ile Met Ala Glu Glu Gly Ile Phe Glu Lys
165 170 175

Gly Asp Arg Leu Trp Ile Ile Asp Pro Ile Asp Gly Thr Ile Asn Phe
180 185 190

Val His Gly Leu Pro Asn Phe Ser Ile Ser Leu Ala Tyr Val Glu Asn
195 200 205

Gly Glu Val Lys Leu Gly Val Val His Ala Pro Ala Leu Asn Glu Thr
210 215 220

Leu Tyr Ala Glu Glu Gly Ser Gly Ala Phe Phe Asn Gly Glu Arg Ile
225 230 235 240

Arg Val Ser Glu Asn Ala Ser Leu Glu Glu Cys Val Gly Ser Thr Gly
245 250 255

Ser Tyr Val Asp Phe Thr Gly Lys Phe Ile Glu Arg Met Glu Lys Arg
260 265 270

Thr Arg Arg Ile Arg Ile Leu Gly Ser Ala Ala Leu Asn Ala Ala Tyr
275 280 285

Val Gly Ala Gly Arg Val Asp Phe Phe Val Thr Trp Arg Ile Asn Pro
290 295 300

Sequence listing

Trp Asp Ile Ala Ala Gly Leu Ile Ile Val Lys Glu Ala Gly Gly Met
 305 310 315 320

Val Thr Asp Phe Ser Gly Lys Glu Ala Asn Ala Phe Ser Lys Asn Phe
 325 330 335

Ile Phe Ser Asn Gly Leu Ile His Asp Glu Val Val Lys Val Val Asn
 340 345 350

Glu Val Val Glu Glu Ile Gly Gly Lys Met Gln Ile Phe Val Lys Thr
 355 360 365

Leu Thr Gly Lys Thr Ile Thr Leu Glu Val Glu Pro Ser Asp Thr Ile
 370 375 380

Glu Asn Val Lys Ala Lys Ile Gln Asp Lys Glu Gly Ile Pro Pro Asp
 385 390 395 400

Gln Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly Arg Thr
 405 410 415

Leu Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr Leu His Leu Val Leu
 420 425 430

Arg Leu Arg Gly Gly
 435

<210> 8
 <211> 772
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Pyruvate oxidase

<400> 8
 Met Gly His His His His His His Ser Asp Gln Glu Ala Lys Pro Ser
 1 5 10 15

Sequence listing

Thr Glu Asp Leu Gly Asp Lys Lys Glu Gly Glu Tyr Ile Lys Leu Lys
 20 25 30

Val Ile Gly Gln Asp Ser Ser Glu Ile His Phe Lys Val Lys Met Thr
 35 40 45

Thr His Leu Lys Lys Leu Lys Glu Ser Tyr Cys Gln Arg Gln Gly Val
 50 55 60

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

Asn His Thr Pro Lys Glu Leu Gly Met Glu Glu Glu Asp Val Ile Glu
 85 90 95

Val Tyr Gln Glu Gln Thr Gly Gly Met Ser Asp Asn Lys Ile Asn Ile
 100 105 110

Gly Leu Ala Val Met Lys Ile Leu Glu Ser Trp Gly Ala Asp Thr Ile
 115 120 125

Tyr Gly Ile Pro Ser Gly Thr Leu Ser Ser Leu Met Asp Ala Met Gly
 130 135 140

Glu Glu Glu Asn Asn Val Lys Phe Leu Gln Val Lys His Glu Glu Val
 145 150 155 160

Gly Ala Met Ala Ala Val Met Gln Ser Lys Phe Gly Gly Asn Leu Gly
 165 170 175

Val Thr Val Gly Ser Gly Gly Pro Gly Ala Ser His Leu Ile Asn Gly
 180 185 190

Leu Tyr Asp Ala Ala Met Asp Asn Ile Pro Val Val Ala Ile Leu Gly
 195 200 205

Ser Arg Pro Gln Arg Glu Leu Asn Met Asp Ala Phe Gln Glu Leu Asn
 210 215 220

Gln Asn Pro Met Tyr Asp His Ile Ala Val Tyr Asn Arg Arg Val Ala

Sequence listing

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

Sequence listing

Leu Lys Asn Ile Ala Asn Trp Arg Glu Tyr Ile Asn Met Leu Glu Thr
450 455 460

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

Asn His Ala Asp Glu Asp Ala Ile Tyr Ser Ile Asp Val Gly Asn Ser
485 490 495

Thr Gln Thr Ser Ile Arg His Leu His Met Thr Pro Lys Asn Met Trp
500 505 510

Arg Thr Ser Pro Leu Phe Ala Thr Met Gly Ile Ala Ile Pro Gly Gly
515 520 525

Leu Gly Ala Lys Asn Thr Tyr Pro Asp Arg Gln Val Trp Asn Ile Ile
530 535 540

Gly Asp Gly Ala Phe Ser Met Thr Tyr Pro Asp Val Val Thr Asn Val
545 550 555 560

Arg Tyr Asn Met Pro Val Ile Asn Val Val Phe Ser Asn Thr Glu Tyr
565 570 575

Ala Phe Ile Lys Asn Lys Tyr Glu Asp Thr Asn Lys Asn Leu Phe Gly
580 585 590

Val Asp Phe Thr Asp Val Asp Tyr Ala Lys Ile Ala Glu Ala Gln Gly
595 600 605

Ala Lys Gly Phe Thr Val Ser Arg Ile Glu Asp Met Asp Arg Val Met
610 615 620

Ala Glu Ala Val Ala Ala Asn Lys Ala Gly His Thr Val Val Ile Asp
625 630 635 640

Cys Lys Ile Thr Gln Asp Arg Pro Ile Pro Val Glu Thr Leu Lys Leu
645 650 655

Asp Ser Lys Leu Tyr Ser Glu Asp Glu Ile Lys Ala Tyr Lys Glu Arg
660 665 670

Sequence listing

Tyr Glu Ala Ala Asn Leu Val Pro Phe Arg Glu Tyr Leu Glu Ala Glu
 675 680 685

Gly Leu Glu Ser Lys Tyr Ile Lys Met Gln Ile Phe Val Lys Thr Leu
 690 695 700

Thr Gly Lys Thr Ile Thr Leu Glu Val Glu Pro Ser Asp Thr Ile Glu
 705 710 715 720

Asn Val Lys Ala Lys Ile Gln Asp Lys Glu Gly Ile Pro Pro Asp Gln
 725 730 735

Gln Arg Leu Ile Phe Ala Gly Lys Gln Leu Glu Asp Gly Arg Thr Leu
 740 745 750

Ser Asp Tyr Asn Ile Gln Lys Glu Ser Thr Leu His Leu Val Leu Arg
 755 760 765

Leu Arg Gly Gly
 770

<210> 9
 <211> 1024
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Yeast UBE1

<400> 9
 Met Ser Ser Asn Asn Ser Gly Leu Ser Ala Ala Gly Glu Ile Asp Glu
 1 5 10 15

Ser Leu Tyr Ser Arg Gln Leu Tyr Val Leu Gly Lys Glu Ala Met Leu
 20 25 30

Lys Met Gln Thr Ser Asn Val Leu Ile Leu Gly Leu Lys Gly Leu Gly
 35 40 45

Sequence listing

Val Glu Ile Ala Lys Asn Val Val Leu Ala Gly Val Lys Ser Met Thr
50 55 60

Val Phe Asp Pro Glu Pro Val Gln Leu Ala Asp Leu Ser Thr Gln Phe
65 70 75 80

Phe Leu Thr Glu Lys Asp Ile Gly Gln Lys Arg Gly Asp Val Thr Arg
85 90 95

Ala Lys Leu Ala Glu Leu Asn Ala Tyr Val Pro Val Asn Val Leu Asp
100 105 110

Ser Leu Asp Asp Val Thr Gln Leu Ser Gln Phe Gln Val Val Val Ala
115 120 125

Thr Asp Thr Val Ser Leu Glu Asp Lys Val Lys Ile Asn Glu Phe Cys
130 135 140

His Ser Ser Gly Ile Arg Phe Ile Ser Ser Glu Thr Arg Gly Leu Phe
145 150 155 160

Gly Asn Thr Phe Val Asp Leu Gly Asp Glu Phe Thr Val Leu Asp Pro
165 170 175

Thr Gly Glu Glu Pro Arg Thr Gly Met Val Ser Asp Ile Glu Pro Asp
180 185 190

Gly Thr Val Thr Met Leu Asp Asp Asn Arg His Gly Leu Glu Asp Gly
195 200 205

Asn Phe Val Arg Phe Ser Glu Val Glu Gly Leu Asp Lys Leu Asn Asp
210 215 220

Gly Thr Leu Phe Lys Val Glu Val Leu Gly Pro Phe Ala Phe Arg Ile
225 230 235 240

Gly Ser Val Lys Glu Tyr Gly Glu Tyr Lys Lys Gly Gly Ile Phe Thr
245 250 255

Glu Val Lys Val Pro Arg Lys Ile Ser Phe Lys Ser Leu Lys Gln Gln

Sequence listing

260

265

270

Leu Ser Asn Pro Glu Phe Val Phe Ser Asp Phe Ala Lys Phe Asp Arg

275

280

285

Ala Ala Gln Leu His Leu Gly Phe Gln Ala Leu His Gln Phe Ala Val

290

295

300

Arg His Asn Gly Glu Leu Pro Arg Thr Met Asn Asp Glu Asp Ala Asn

305

310

315

320

Glu Leu Ile Lys Leu Val Thr Asp Leu Ser Val Gln Gln Pro Glu Val

325

330

335

Leu Gly Glu Gly Val Asp Val Asn Glu Asp Leu Ile Lys Glu Leu Ser

340

345

350

Tyr Gln Ala Arg Gly Asp Ile Pro Gly Val Val Ala Phe Phe Gly Gly

355

360

365

Leu Val Ala Gln Glu Val Leu Lys Ala Cys Ser Gly Lys Phe Thr Pro

370

375

380

Leu Lys Gln Phe Met Tyr Phe Asp Ser Leu Glu Ser Leu Pro Asp Pro

385

390

395

400

Lys Asn Phe Pro Arg Asn Glu Lys Thr Thr Gln Pro Val Asn Ser Arg

405

410

415

Tyr Asp Asn Gln Ile Ala Val Phe Gly Leu Asp Phe Gln Lys Lys Ile

420

425

430

Ala Asn Ser Lys Val Phe Leu Val Gly Ser Gly Ala Ile Gly Cys Glu

435

440

445

Met Leu Lys Asn Trp Ala Leu Leu Gly Leu Gly Ser Gly Ser Asp Gly

450

455

460

Tyr Ile Val Val Thr Asp Asn Asp Ser Ile Glu Lys Ser Asn Leu Asn

465

470

475

480

Sequence listing

Arg Gln Phe Leu Phe Arg Pro Lys Asp Val Gly Lys Asn Lys Ser Glu
485 490 495

Val Ala Ala Glu Ala Val Cys Ala Met Asn Pro Asp Leu Lys Gly Lys
500 505 510

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

Asn Asp Ser Phe Trp Glu Ser Leu Asp Phe Val Thr Asn Ala Leu Asp
530 535 540

Asn Val Asp Ala Arg Thr Tyr Val Asp Arg Arg Cys Val Phe Tyr Arg
545 550 555 560

Lys Pro Leu Leu Glu Ser Gly Thr Leu Gly Thr Lys Gly Asn Thr Gln
565 570 575

Val Ile Ile Pro Arg Leu Thr Glu Ser Tyr Ser Ser Ser Arg Asp Pro
580 585 590

Pro Glu Lys Ser Ile Pro Leu Cys Thr Leu Arg Ser Phe Pro Asn Lys
595 600 605

Ile Asp His Thr Ile Ala Trp Ala Lys Ser Leu Phe Gln Gly Tyr Phe
610 615 620

Thr Asp Ser Ala Glu Asn Val Asn Met Tyr Leu Thr Gln Pro Asn Phe
625 630 635 640

Val Glu Gln Thr Leu Lys Gln Ser Gly Asp Val Lys Gly Val Leu Glu
645 650 655

Ser Ile Ser Asp Ser Leu Ser Ser Lys Pro His Asn Phe Glu Asp Cys
660 665 670

Ile Lys Trp Ala Arg Leu Glu Phe Glu Lys Lys Phe Asn His Asp Ile
675 680 685

Lys Gln Leu Leu Phe Asn Phe Pro Lys Asp Ala Lys Thr Ser Asn Gly
690 695 700

Sequence listing

Glu Pro Phe Trp Ser Gly Ala Lys Arg Ala Pro Thr Pro Leu Glu Phe
705 710 715 720

Asp Ile Tyr Asn Asn Asp His Phe His Phe Val Val Ala Gly Ala Ser
 725 730 735

Leu Arg Ala Tyr Asn Tyr Gly Ile Lys Ser Asp Asp Ser Asn Ser Lys
 740 745 750

Pro Asn Val Asp Glu Tyr Lys Ser Val Ile Asp His Met Ile Ile Pro
 755 760 765

Glu Phe Thr Pro Asn Ala Asn Leu Lys Ile Gln Val Asn Asp Asp Asp
 770 775 780

Pro Asp Pro Asn Ala Asn Ala Ala Asn Gly Ser Asp Glu Ile Asp Gln
785 790 795 800

Leu Val Ser Ser Leu Pro Asp Pro Ser Thr Leu Ala Gly Phe Lys Leu
 805 810 815

Glu Pro Val Asp Phe Glu Lys Asp Asp Asp Thr Asn His His Ile Glu
 820 825 830

Phe Ile Thr Ala Cys Ser Asn Cys Arg Ala Gln Asn Tyr Phe Ile Glu
 835 840 845

Thr Ala Asp Arg Gln Lys Thr Lys Phe Ile Ala Gly Arg Ile Ile Pro
 850 855 860

Ala Ile Ala Thr Thr Thr Ser Leu Val Thr Gly Leu Val Asn Leu Glu
865 870 875 880

Leu Tyr Lys Leu Ile Asp Asn Lys Thr Asp Ile Glu Gln Tyr Lys Asn
 885 890 895

Gly Phe Val Asn Leu Ala Leu Pro Phe Phe Gly Phe Ser Glu Pro Ile
 900 905 910

Ala Ser Pro Lys Gly Glu Tyr Asn Asn Lys Lys Tyr Asp Lys Ile Trp

Sequence listing

915

920

925

Asp Arg Phe Asp Ile Lys Gly Asp Ile Lys Leu Ser Asp Leu Ile Glu
930 935 940

His Phe Glu Lys Asp Glu Gly Leu Glu Ile Thr Met Leu Ser Tyr Gly
945 950 955 960

Val Ser Leu Leu Tyr Ala Ser Phe Phe Pro Pro Lys Lys Leu Lys Glu
965 970 975

Arg Leu Asn Leu Pro Ile Thr Gln Leu Val Lys Leu Val Thr Lys Lys
980 985 990

Asp Ile Pro Ala His Val Ser Thr Met Ile Leu Glu Ile Cys Ala Asp
995 1000 1005

Asp Lys Glu Gly Glu Asp Val Glu Val Pro Phe Ile Thr Ile His Leu
1010 1015 1020

<210> 10

<211> 147

<212> PRT

<213> Artificial Sequence

<220>

<223> Ubch5a (Homo sapiens)

<400> 10

Met Ala Leu Lys Arg Ile Gln Lys Glu Leu Ser Asp Leu Gln Arg Asp
1 5 10 15

Pro Pro Ala His Cys Ser Ala Gly Pro Val Gly Asp Asp Leu Phe His
20 25 30

Trp Gln Ala Thr Ile Met Gly Pro Pro Asp Ser Ala Tyr Gln Gly Gly
35 40 45

Sequence listing

Val Phe Phe Leu Thr Val His Phe Pro Thr Asp Tyr Pro Phe Lys Pro
 50 55 60

Pro Lys Ile Ala Phe Thr Thr Lys Ile Tyr His Pro Asn Ile Asn Ser
 65 70 75 80

Asn Gly Ser Ile Cys Leu Asp Ile Leu Arg Ser Gln Trp Ser Pro Ala
 85 90 95

Leu Thr Val Ser Lys Val Leu Leu Ser Ile Cys Ser Leu Leu Cys Asp
 100 105 110

Pro Asn Pro Asp Asp Pro Leu Val Pro Asp Ile Ala Gln Ile Tyr Lys
 115 120 125

Ser Asp Lys Glu Lys Tyr Asn Arg His Ala Arg Glu Trp Thr Gln Lys
 130 135 140

Tyr Ala Met
 145

<210> 11
 <211> 154
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Ubch7 (Homo sapiens)

<400> 11
 Met Ala Ala Ser Arg Arg Leu Met Lys Glu Leu Glu Glu Ile Arg Lys
 1 5 10 15

Cys Gly Met Lys Asn Phe Arg Asn Ile Gln Val Asp Glu Ala Asn Leu
 20 25 30

Leu Thr Trp Gln Gly Leu Ile Val Pro Asp Asn Pro Pro Tyr Asp Lys
 35 40 45

Sequence listing

Gly Ala Phe Arg Ile Glu Ile Asn Phe Pro Ala Glu Tyr Pro Phe Lys
 50 55 60

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

Glu Lys Gly Gln Val Cys Leu Pro Val Ile Ser Ala Glu Asn Trp Lys
 85 90 95

Pro Ala Thr Lys Thr Asp Gln Val Ile Gln Ser Leu Ile Ala Leu Val
 100 105 110

Asn Asp Pro Gln Pro Glu His Pro Leu Arg Ala Asp Leu Ala Glu Glu
 115 120 125

Tyr Ser Lys Asp Arg Lys Lys Phe Cys Lys Asn Ala Glu Glu Phe Thr
 130 135 140

Lys Lys Tyr Gly Glu Lys Arg Pro Val Asp
 145 150

<210> 12

<211> 200

<212> PRT

<213> Artificial Sequence

<220>

<223> E2-25K (Homo sapiens)

<400> 12

Met Ala Asn Ile Ala Val Gln Arg Ile Lys Arg Glu Phe Lys Glu Val
 1 5 10 15

Leu Lys Ser Glu Glu Thr Ser Lys Asn Gln Ile Lys Val Asp Leu Val
 20 25 30

Asp Glu Asn Phe Thr Glu Leu Arg Gly Glu Ile Ala Gly Pro Pro Asp
 35 40 45

Sequence listing

Thr Pro Tyr Glu Gly Gly Arg Tyr Gln Leu Glu Ile Lys Ile Pro Glu
50 55 60

Thr Tyr Pro Phe Asn Pro Pro Lys Val Arg Phe Ile Thr Lys Ile Trp
65 70 75 80

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

Lys Asp Gln Trp Ala Ala Ala Met Thr Leu Arg Thr Val Leu Leu Ser
100 105 110

Leu Gln Ala Leu Leu Ala Ala Ala Glu Pro Asp Asp Pro Gln Asp Ala
115 120 125

Val Val Ala Asn Gln Tyr Lys Gln Asn Pro Glu Met Phe Lys Gln Thr
130 135 140

Ala Arg Leu Trp Ala His Val Tyr Ala Gly Ala Pro Val Ser Ser Pro
145 150 155 160

Glu Tyr Thr Lys Lys Ile Glu Asn Leu Cys Ala Met Gly Phe Asp Arg
165 170 175

Asn Ala Val Ile Val Ala Leu Ser Ser Lys Ser Trp Asp Val Glu Thr
180 185 190

Ala Thr Glu Leu Leu Leu Ser Asn
195 200

<210> 13

<211> 153

<212> PRT

<213> Artificial Sequence

<220>

<223> Ubc13 (*Saccharomyces cerevisiae*)

Sequence listing

<400> 13

Met Ala Ser Leu Pro Lys Arg Ile Ile Lys Glu Thr Glu Lys Leu Val
1 5 10 15

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

Arg Tyr Phe Gln Val Thr Ile Glu Gly Pro Glu Gln Ser Pro Tyr Glu
35 40 45

Asp Gly Ile Phe Glu Leu Glu Leu Tyr Leu Pro Asp Asp Tyr Pro Met
50 55 60

Glu Ala Pro Lys Val Arg Phe Leu Thr Lys Ile Tyr His Pro Asn Ile
65 70 75 80

Asp Arg Leu Gly Arg Ile Cys Leu Asp Val Leu Lys Thr Asn Trp Ser
85 90 95

Pro Ala Leu Gln Ile Arg Thr Val Leu Leu Ser Ile Gln Ala Leu Leu
100 105 110

Ala Ser Pro Asn Pro Asn Asp Pro Leu Ala Asn Asp Val Ala Glu Asp
115 120 125

Trp Ile Lys Asn Glu Gln Gly Ala Lys Ala Lys Ala Arg Glu Trp Thr
130 135 140

Lys Leu Tyr Ala Lys Lys Lys Pro Glu
145 150

<210> 14

<211> 137

<212> PRT

<213> Artificial Sequence

<220>

<223> MMS2 (UEV - Ubiquitin-conjugating enzyme variant) (*Saccharomyces cerevisiae*)

Sequence listing

<400> 14

Met Ser Lys Val Pro Arg Asn Phe Arg Leu Leu Glu Glu Leu Glu Lys
1 5 10 15

Gly Glu Lys Gly Phe Gly Pro Glu Ser Cys Ser Tyr Gly Leu Ala Asp
20 25 30

Ser Asp Asp Ile Thr Met Thr Lys Trp Asn Gly Thr Ile Leu Gly Pro
35 40 45

Pro His Ser Asn His Glu Asn Arg Ile Tyr Ser Leu Ser Ile Asp Cys
50 55 60

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

Ile Asn Leu Pro Cys Val Asn Pro Thr Thr Gly Glu Val Gln Thr Asp
85 90 95

Phe His Thr Leu Arg Asp Trp Lys Arg Ala Tyr Thr Met Glu Thr Leu
100 105 110

Leu Leu Asp Leu Arg Lys Glu Met Ala Thr Pro Ala Asn Lys Lys Leu
115 120 125

Arg Gln Pro Lys Glu Gly Glu Thr Phe
130 135

<210> 15

<211> 807

<212> PRT

<213> Artificial Sequence

<220>

<223> E3 RSP5

<400> 15

Met Pro Ser Ser Ile Ser Val Lys Leu Val Ala Ala Glu Ser Leu Tyr

Sequence listing

1 5 10 15

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

Asp Gly Tyr Gln Thr Lys Ser Thr Ser Ala Ala Lys Lys Thr Leu Asn
35 40 45

Pro Tyr Trp Asn Glu Thr Phe Lys Phe Asp Asp Ile Asn Glu Asn Ser
50 55 60

Ile Leu Thr Ile Gln Val Phe Asp Gln Lys Lys Phe Lys Lys Lys Asp
65 70 75 80

Gln Gly Phe Leu Gly Val Val Asn Val Arg Val Gly Asp Val Leu Gly
85 90 95

His Leu Asp Glu Asp Thr Ala Thr Ser Ser Gly Arg Pro Arg Glu Glu
100 105 110

Thr Ile Thr Arg Asp Leu Lys Lys Ser Asn Asp Gly Met Ala Val Ser
115 120 125

Gly Arg Leu Ile Val Val Leu Ser Lys Leu Pro Ser Ser Ser Pro His
130 135 140

Ser Gln Ala Pro Ser Gly His Thr Ala Ser Ser Ser Thr Asn Thr Ser
145 150 155 160

Ser Thr Thr Arg Thr Asn Gly His Ser Thr Ser Ser Thr Arg Asn His
165 170 175

Ser Thr Ser His Pro Ser Arg Gly Thr Ala Gln Ala Val Glu Ser Thr
180 185 190

Leu Gln Ser Gly Thr Thr Ala Ala Thr Asn Thr Ala Thr Thr Ser His
195 200 205

Arg Ser Thr Asn Ser Thr Ser Ser Ala Thr Arg Gln Tyr Ser Ser Phe
210 215 220

Sequence listing

Glu Asp Gln Tyr Gly Arg Leu Pro Pro Gly Trp Glu Arg Arg Thr Asp
225 230 235 240

Asn Phe Gly Arg Thr Tyr Tyr Val Asp His Asn Thr Arg Thr Thr Thr
245 250 255

Trp Lys Arg Pro Thr Leu Asp Gln Thr Glu Ala Glu Arg Gly Gln Leu
260 265 270

Asn Ala Asn Thr Glu Leu Glu Arg Arg Gln His Arg Gly Arg Thr Leu
275 280 285

Pro Gly Gly Ser Ser Asp Asn Ser Ser Val Thr Val Gln Val Gly Gly
290 295 300

Gly Ser Asn Ile Pro Pro Val Asn Gly Ala Ala Ala Ala Phe Ala
305 310 315 320

Ala Thr Gly Gly Thr Thr Ser Gly Leu Gly Glu Leu Pro Ser Gly Trp
325 330 335

Glu Gln Arg Phe Thr Pro Glu Gly Arg Ala Tyr Phe Val Asp His Asn
340 345 350

Thr Arg Thr Thr Thr Trp Val Asp Pro Arg Arg Gln Gln Tyr Ile Arg
355 360 365

Thr Tyr Gly Pro Thr Asn Thr Thr Ile Gln Gln Gln Pro Val Ser Gln
370 375 380

Leu Gly Pro Leu Pro Ser Gly Trp Glu Met Arg Leu Thr Asn Thr Ala
385 390 395 400

Arg Val Tyr Phe Val Asp His Asn Thr Lys Thr Thr Thr Trp Asp Asp
405 410 415

Pro Arg Leu Pro Ser Ser Leu Asp Gln Asn Val Pro Gln Tyr Lys Arg
420 425 430

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

Sequence listing

Ile Leu Pro Gly Gln Cys His Ile Lys Val Arg Arg Lys Asn Ile Phe
450 455 460

Glu Asp Ala Tyr Gln Glu Ile Met Arg Gln Thr Pro Glu Asp Leu Lys
465 470 475 480

Lys Arg Leu Met Ile Lys Phe Asp Gly Glu Glu Gly Leu Asp Tyr Gly
485 490 495

Gly Val Ser Arg Glu Phe Phe Phe Leu Leu Ser His Glu Met Phe Asn
500 505 510

Pro Phe Tyr Cys Leu Phe Glu Tyr Ser Ala Tyr Asp Asn Tyr Thr Ile
515 520 525

Gln Ile Asn Pro Asn Ser Gly Ile Asn Pro Glu His Leu Asn Tyr Phe
530 535 540

Lys Phe Ile Gly Arg Val Val Gly Leu Gly Val Phe His Arg Arg Phe
545 550 555 560

Leu Asp Ala Phe Phe Val Gly Ala Leu Tyr Lys Met Met Leu Arg Lys
565 570 575

Lys Val Val Leu Gln Asp Met Glu Gly Val Asp Ala Glu Val Tyr Asn
580 585 590

Ser Leu Asn Trp Met Leu Glu Asn Ser Ile Asp Gly Val Leu Asp Leu
595 600 605

Thr Phe Ser Ala Asp Asp Glu Arg Phe Gly Glu Val Val Thr Val Asp
610 615 620

Leu Lys Pro Asp Gly Arg Asn Ile Glu Val Thr Asp Gly Asn Lys Lys
625 630 635 640

Glu Tyr Val Glu Leu Tyr Thr Gln Trp Arg Ile Val Asp Arg Val Gln
645 650 655

Glu Gln Phe Lys Ala Phe Met Asp Gly Phe Asn Glu Ile Pro Glu Asp

Sequence listing

660

665

670

Leu Val Thr Val Phe Asp Glu Arg Glu Leu Glu Leu Ile Gly Gly
675 680 685

Ile Ala Glu Ile Asp Ile Glu Asp Trp Lys Lys His Thr Asp Tyr Arg
690 695 700

Gly Tyr Gln Glu Ser Asp Glu Val Ile Gln Trp Phe Trp Lys Cys Val
705 710 715 720

Ser Glu Trp Asp Asn Glu Gln Arg Ala Arg Leu Leu Gln Phe Thr Thr
725 730 735

Gly Thr Ser Arg Ile Pro Val Asn Gly Phe Lys Asp Leu Gln Gly Ser
740 745 750

Asp Gly Pro Arg Arg Phe Thr Ile Glu Lys Ala Gly Glu Val Gln Gln
755 760 765

Leu Pro Lys Ser His Thr Cys Phe Asn Arg Val Asp Leu Pro Gln Tyr
770 775 780

Val Asp Tyr Asp Ser Met Lys Gln Lys Leu Thr Leu Ala Val Glu Glu
785 790 795 800

Thr Ile Gly Phe Gly Gln Glu
805

<210> 16

<211> 1319

<212> PRT

<213> Artificial Sequence

<220>

<223> E3 DOA10

<400> 16

Met Asp Val Asp Ser Asp Val Asn Val Ser Arg Leu Arg Asp Glu Leu

Sequence listing

1 5 10 15

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

Ala Pro Ser Gly Ala Thr Cys Arg Ile Cys Arg Gly Glu Ala Thr Glu
35 40 45

Asp Asn Pro Leu Phe His Pro Cys Lys Cys Arg Gly Ser Ile Lys Tyr
50 55 60

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

Ile Ser Lys Pro Gly Ala Asp Val Lys Cys Asp Ile Cys His Tyr Pro
85 90 95

Ile Gln Phe Lys Thr Ile Tyr Ala Glu Asn Met Pro Glu Lys Ile Pro
100 105 110

Phe Ser Leu Leu Leu Ser Lys Ser Ile Leu Thr Phe Phe Glu Lys Ala
115 120 125

Arg Leu Ala Leu Thr Ile Gly Leu Ala Ala Val Leu Tyr Ile Ile Gly
130 135 140

Val Pro Leu Val Trp Asn Met Phe Gly Lys Leu Tyr Thr Met Met Leu
145 150 155 160

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

Gly Tyr Asp Gln Ser Ala Thr Pro Glu Leu Thr Thr Arg Ala Ile Phe
180 185 190

Tyr Gln Leu Leu Gln Asn His Ser Phe Thr Ser Leu Gln Phe Ile Met
195 200 205

Ile Val Ile Leu His Ile Ala Leu Tyr Phe Gln Tyr Asp Met Ile Val
210 215 220

Sequence listing

Arg Glu Asp Val Phe Ser Lys Met Val Phe His Lys Ile Gly Pro Arg
225 230 235 240

Leu Ser Pro Lys Asp Leu Lys Ser Arg Leu Lys Glu Arg Phe Pro Met
245 250 255

Met Asp Asp Arg Met Val Glu Tyr Leu Ala Arg Glu Met Arg Ala His
260 265 270

Asp Glu Asn Arg Gln Glu Gln Gly His Asp Arg Leu Asn Met Pro Ala
275 280 285

Ala Ala Ala Asp Asn Asn Asn Asn Val Ile Asn Pro Arg Asn Asp Asn
290 295 300

Val Pro Pro Gln Asp Pro Asn Asp His Arg Asn Phe Glu Asn Leu Arg
305 310 315 320

His Val Asp Glu Leu Asp His Asp Glu Ala Thr Glu Glu His Glu Asn
325 330 335

Asn Asp Ser Asp Asn Ser Leu Pro Ser Gly Asp Asp Ser Ser Arg Ile
340 345 350

Leu Pro Gly Ser Ser Ser Asp Asn Glu Glu Asp Glu Glu Ala Glu Gly
355 360 365

Gln Gln Gln Gln Gln Gln Pro Glu Glu Glu Ala Asp Tyr Arg Asp His
370 375 380

Ile Glu Pro Asn Pro Ile Asp Met Trp Ala Asn Arg Arg Ala Gln Asn
385 390 395 400

Glu Phe Asp Asp Leu Ile Ala Ala Gln Gln Asn Ala Ile Asn Arg Pro
405 410 415

Asn Ala Pro Val Phe Ile Pro Pro Pro Ala Gln Asn Arg Ala Gly Asn
420 425 430

Val Asp Gln Asp Glu Gln Asp Phe Gly Ala Ala Val Gly Val Pro Pro
435 440 445

Sequence listing

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

Leu Lys Leu Lys Leu Leu Asn Val Ile Ala Tyr Phe Ile Ile Ala Val
465 470 475 480

Val Phe Thr Ala Ile Tyr Leu Ala Ile Ser Tyr Leu Phe Pro Thr Phe
485 490 495

Ile Gly Phe Gly Leu Leu Lys Ile Tyr Phe Gly Ile Phe Lys Val Ile
500 505 510

Leu Arg Gly Leu Cys His Leu Tyr Tyr Leu Ser Gly Ala His Ile Ala
515 520 525

Tyr Asn Gly Leu Thr Lys Leu Val Pro Lys Val Asp Val Ala Met Ser
530 535 540

Trp Ile Ser Asp His Leu Ile His Asp Ile Ile Tyr Leu Tyr Asn Gly
545 550 555 560

Tyr Thr Glu Asn Thr Met Lys His Ser Ile Phe Ile Arg Ala Leu Pro
565 570 575

Ala Leu Thr Thr Tyr Leu Thr Ser Val Ser Ile Val Cys Ala Ser Ser
580 585 590

Asn Leu Val Ser Arg Gly Tyr Gly Arg Glu Asn Gly Met Ser Asn Pro
595 600 605

Thr Arg Arg Leu Ile Phe Gln Ile Leu Phe Ala Leu Lys Cys Thr Phe
610 615 620

Lys Val Phe Thr Leu Phe Phe Ile Glu Leu Ala Gly Phe Pro Ile Leu
625 630 635 640

Ala Gly Val Met Leu Asp Phe Ser Leu Phe Cys Pro Ile Leu Ala Ser
645 650 655

Asn Ser Arg Met Leu Trp Val Pro Ser Ile Cys Ala Ile Trp Pro Pro

Sequence listing

660

665

670

Phe Ser Leu Phe Val Tyr Trp Thr Ile Gly Thr Leu Tyr Met Tyr Trp

675

680

685

Phe Ala Lys Tyr Ile Gly Met Ile Arg Lys Asn Ile Ile Arg Pro Gly

690

695

700

Val Leu Phe Phe Ile Arg Ser Pro Glu Asp Pro Asn Ile Lys Ile Leu

705

710

715

720

His Asp Ser Leu Ile His Pro Met Ser Ile Gln Leu Ser Arg Leu Cys

725

730

735

Leu Ser Met Phe Ile Tyr Ala Ile Phe Ile Val Leu Gly Phe Gly Phe

740

745

750

His Thr Arg Ile Phe Phe Pro Phe Met Leu Lys Ser Asn Leu Leu Ser

755

760

765

Val Pro Glu Ala Tyr Lys Pro Thr Ser Ile Ile Ser Trp Lys Phe Asn

770

775

780

Thr Ile Leu Leu Thr Leu Tyr Phe Thr Lys Arg Ile Leu Glu Ser Ser

785

790

795

800

Ser Tyr Val Lys Pro Leu Leu Glu Arg Tyr Trp Lys Thr Ile Phe Lys

805

810

815

Leu Cys Ser Arg Lys Leu Arg Leu Ser Ser Phe Ile Leu Gly Lys Asp

820

825

830

Thr Pro Thr Glu Arg Gly His Ile Val Tyr Arg Asn Leu Phe Tyr Lys

835

840

845

Tyr Ile Ala Ala Lys Asn Ala Glu Trp Ser Asn Gln Glu Leu Phe Thr

850

855

860

Lys Pro Lys Thr Leu Glu Gln Ala Glu Glu Leu Phe Gly Gln Val Arg

865

870

875

880

Sequence listing

Asp Val His Ala Tyr Phe Val Pro Asp Gly Val Leu Met Arg Val Pro
885 890 895

Ser Ser Asp Ile Val Ser Arg Asn Tyr Val Gln Thr Met Phe Val Pro
900 905 910

Val Thr Lys Asp Asp Lys Leu Leu Lys Pro Leu Asp Leu Glu Arg Ile
915 920 925

Lys Glu Arg Asn Lys Arg Ala Ala Gly Glu Phe Gly Tyr Leu Asp Glu
930 935 940

Gln Asn Thr Glu Tyr Asp Gln Tyr Tyr Ile Val Tyr Val Pro Pro Asp
945 950 955 960

Phe Arg Leu Arg Tyr Met Thr Leu Leu Gly Leu Val Trp Leu Phe Ala
965 970 975

Ser Ile Leu Met Leu Gly Val Thr Phe Ile Ser Gln Ala Leu Ile Asn
980 985 990

Phe Val Cys Ser Phe Gly Phe Leu Pro Val Val Lys Leu Leu Leu Gly
995 1000 1005

Glu Arg Asn Lys Val Tyr Val Ala Trp Lys Glu Leu Ser Asp Ile Ser
1010 1015 1020

Tyr Ser Tyr Leu Asn Ile Tyr Tyr Val Cys Val Gly Ser Val Cys Leu
1025 1030 1035 1040

Ser Lys Ile Ala Lys Asp Ile Leu His Phe Thr Glu Gly Gln Asn Thr
1045 1050 1055

Leu Asp Glu His Ala Val Asp Glu Asn Glu Val Glu Glu Val Glu His
1060 1065 1070

Asp Ile Pro Glu Arg Asp Ile Asn Asn Ala Pro Val Asn Asn Ile Asn
1075 1080 1085

Asn Val Glu Glu Gly Gln Gly Ile Phe Met Ala Ile Phe Asn Ser Ile
1090 1095 1100

Sequence listing

Phe Asp Ser Met Leu Val Lys Tyr Asn Leu Met Val Phe Ile Ala Ile
1105 1110 1115 1120

Met Ile Ala Val Ile Arg Thr Met Val Ser Trp Val Val Leu Thr Asp
 1125 1130 1135

Gly Ile Leu Ala Cys Tyr Asn Tyr Leu Thr Ile Arg Val Phe Gly Asn
 1140 1145 1150

Ser Ser Tyr Thr Ile Gly Asn Ser Lys Trp Phe Lys Tyr Asp Glu Ser
 1155 1160 1165

Leu Leu Phe Val Val Trp Ile Ile Ser Ser Met Val Asn Phe Gly Thr
 1170 1175 1180

Gly Tyr Lys Ser Leu Lys Leu Phe Phe Arg Asn Arg Asn Thr Ser Lys
1185 1190 1195 1200

Leu Asn Phe Leu Lys Thr Met Ala Leu Glu Leu Phe Lys Gln Gly Phe
 1205 1210 1215

Leu His Met Val Ile Tyr Val Leu Pro Ile Ile Ile Leu Ser Leu Val
 1220 1225 1230

Phe Leu Arg Asp Val Ser Thr Lys Gln Ile Ile Asp Ile Ser His Gly
 1235 1240 1245

Ser Arg Ser Phe Thr Leu Ser Leu Asn Glu Ser Phe Pro Thr Trp Thr
 1250 1255 1260

Arg Met Gln Asp Ile Tyr Phe Gly Leu Leu Ile Ala Leu Glu Ser Phe
1265 1270 1275 1280

Thr Phe Phe Phe Gln Ala Thr Val Leu Phe Ile Gln Trp Phe Lys Ser
 1285 1290 1295

Thr Val Gln Asn Val Lys Asp Glu Val Tyr Thr Lys Gly Arg Ala Leu
 1300 1305 1310

Glu Asn Leu Pro Asp Glu Ser

Sequence listing

1315

<210> 17
 <211> 278
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> E3 MARCH5

<400> 17
 Met Pro Asp Gln Ala Leu Gln Gln Met Leu Asp Arg Ser Cys Trp Val
 1 5 10 15

Cys Phe Ala Thr Asp Glu Asp Asp Arg Thr Ala Glu Trp Val Arg Pro
 20 25 30

Cys Arg Cys Arg Gly Ser Thr Lys Trp Val His Gln Ala Cys Leu Gln
 35 40 45

Arg Trp Val Asp Glu Lys Gln Arg Gly Asn Ser Thr Ala Arg Val Ala
 50 55 60

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

Pro Val Val Tyr Val Leu Asp Leu Ala Asp Arg Leu Ile Ser Lys Ala
 85 90 95

Cys Pro Phe Ala Ala Ala Gly Ile Met Val Gly Ser Ile Tyr Trp Thr
 100 105 110

Ala Val Thr Tyr Gly Ala Val Thr Val Met Gln Val Val Gly His Lys
 115 120 125

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

Gly Leu Pro Thr Ile Pro Val Met Leu Ile Leu Gly Lys Met Ile Arg

Sequence listing

145 150 155 160
 Trp Glu Asp Tyr Val Leu Arg Leu Trp Arg Lys Tyr Ser Asn Lys Leu
 165 170 175
 Gln Ile Leu Asn Ser Ile Phe Pro Gly Ile Gly Cys Pro Val Pro Arg
 180 185 190
 Ile Pro Ala Glu Ala Asn Pro Leu Ala Asp His Val Ser Ala Thr Arg
 195 200 205
 Ile Leu Cys Gly Ala Leu Val Phe Pro Thr Ile Ala Thr Ile Val Gly
 210 215 220
 Lys Leu Met Phe Ser Ser Val Asn Ser Asn Leu Gln Arg Thr Ile Leu
 225 230 235 240
 Gly Gly Ile Ala Phe Val Ala Ile Lys Gly Ala Phe Lys Val Tyr Phe
 245 250 255
 Lys Gln Gln Gln Tyr Leu Arg Gln Ala His Arg Lys Ile Leu Asn Tyr
 260 265 270
 Pro Glu Gln Glu Glu Ala
 275

<210> 18
 <211> 1116
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> His-SUMO-hGH-Ub(D)

<400> 18
 Met Glu Thr Gly Leu Tyr His Ile Ser His Ile Ser His Ile Ser His
 1 5 10 15

Ile Ser His Ile Ser His Ile Ser Ser Glu Arg Ala Ser Pro Gly Leu

Sequence listing

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

Sequence listing

Ala Ser Asn His Ile Ser Thr His Arg Pro Arg Ala Leu Tyr Ser Gly
245 250 255

Leu Ala Leu Glu Ala Gly Leu Tyr Met Glu Thr Gly Leu Ala Gly Leu
260 265 270

Ala Gly Leu Ala Ala Ser Pro Val Ala Leu Ile Leu Glu Gly Leu Ala
275 280 285

Val Ala Leu Thr Tyr Arg Gly Leu Asn Gly Leu Ala Gly Leu Asn Thr
290 295 300

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

Arg Ile Leu Glu Pro Arg Ala Leu Glu Ala Ser Glu Arg Ala Arg Gly
325 330 335

Leu Glu Ala Pro His Glu Ala Ser Pro Ala Ser Asn Ala Leu Ala Met
340 345 350

Glu Thr Leu Glu Ala Ala Arg Gly Ala Leu Ala His Ile Ser Ala Arg
355 360 365

Gly Leu Glu Ala His Ile Ser Gly Leu Asn Leu Glu Ala Ala Leu Ala
370 375 380

Pro His Glu Ala Ser Pro Thr His Arg Thr Tyr Arg Gly Leu Asn Gly
385 390 395 400

Leu Ala Pro His Glu Gly Leu Ala Gly Leu Ala Ala Leu Ala Thr Tyr
405 410 415

Arg Ile Leu Glu Pro Arg Ala Leu Tyr Ser Gly Leu Ala Gly Leu Asn
420 425 430

Leu Tyr Ser Thr Tyr Arg Ser Glu Arg Pro His Glu Leu Glu Ala Gly
435 440 445

Leu Asn Ala Ser Asn Pro Arg Ala Gly Leu Asn Thr His Arg Ser Glu
450 455 460

Sequence listing

Arg Leu Glu Ala Cys Tyr Ser Pro His Glu Ser Glu Arg Gly Leu Ala
465 470 475 480

Ser Glu Arg Ile Leu Glu Pro Arg Ala Thr His Arg Pro Arg Ala Ser
485 490 495

Glu Arg Ala Ser Asn Ala Arg Gly Gly Leu Ala Gly Leu Ala Thr His
500 505 510

Arg Gly Leu Asn Gly Leu Asn Leu Tyr Ser Ser Glu Arg Ala Ser Asn
515 520 525

Leu Glu Ala Gly Leu Ala Leu Glu Ala Leu Glu Ala Ala Arg Gly Ile
530 535 540

Leu Glu Ser Glu Arg Leu Glu Ala Leu Glu Ala Leu Glu Ala Ile Leu
545 550 555 560

Glu Gly Leu Asn Ser Glu Arg Thr Arg Pro Leu Glu Ala Gly Leu Ala
565 570 575

Pro Arg Ala Val Ala Leu Gly Leu Asn Pro His Glu Leu Glu Ala Ala
580 585 590

Arg Gly Ser Glu Arg Val Ala Leu Pro His Glu Ala Leu Ala Ala Ser
595 600 605

Asn Ser Glu Arg Leu Glu Ala Val Ala Leu Thr Tyr Arg Gly Leu Tyr
610 615 620

Ala Leu Ala Ser Glu Arg Ala Ser Pro Ser Glu Arg Ala Ser Asn Val
625 630 635 640

Ala Leu Thr Tyr Arg Ala Ser Pro Leu Glu Ala Leu Glu Ala Leu Tyr
645 650 655

Ser Ala Ser Pro Leu Glu Ala Gly Leu Ala Gly Leu Ala Gly Leu Tyr
660 665 670

Ile Leu Glu Gly Leu Asn Thr His Arg Leu Glu Ala Met Glu Thr Gly

Sequence listing

675

680

685

Leu Tyr Ala Arg Gly Leu Glu Ala Gly Leu Ala Ala Ser Pro Gly Leu
690 695 700

Tyr Ser Glu Arg Pro Arg Ala Ala Arg Gly Thr His Arg Gly Leu Tyr
705 710 715 720

Gly Leu Asn Ile Leu Glu Pro His Glu Leu Tyr Ser Gly Leu Asn Thr
725 730 735

His Arg Thr Tyr Arg Ser Glu Arg Leu Tyr Ser Pro His Glu Ala Ser
740 745 750

Pro Thr His Arg Ala Ser Asn Ser Glu Arg His Ile Ser Ala Ser Asn
755 760 765

Ala Ser Pro Ala Ser Pro Ala Leu Ala Leu Glu Ala Leu Glu Ala Leu
770 775 780

Tyr Ser Ala Ser Asn Thr Tyr Arg Gly Leu Tyr Leu Glu Ala Leu Glu
785 790 795 800

Ala Thr Tyr Arg Cys Tyr Ser Pro His Glu Ala Arg Gly Leu Tyr Ser
805 810 815

Ala Ser Pro Met Glu Thr Ala Ser Pro Leu Tyr Ser Val Ala Leu Gly
820 825 830

Leu Ala Thr His Arg Pro His Glu Leu Glu Ala Ala Arg Gly Ile Leu
835 840 845

Glu Val Ala Leu Gly Leu Asn Cys Tyr Ser Ala Arg Gly Ser Glu Arg
850 855 860

Val Ala Leu Gly Leu Ala Gly Leu Tyr Ser Glu Arg Cys Tyr Ser Gly
865 870 875 880

Leu Tyr Pro His Glu Met Glu Thr Gly Leu Asn Ile Leu Glu Pro His
885 890 895

Sequence listing

Glu Val Ala Leu Ala Arg Gly Thr His Arg Leu Glu Ala Thr His Arg
900 905 910

Gly Leu Tyr Ala Arg Gly Thr His Arg Ile Leu Glu Thr His Arg Leu
915 920 925

Glu Ala Gly Leu Ala Val Ala Leu Gly Leu Ala Pro Arg Ala Ser Glu
930 935 940

Arg Ala Ser Pro Thr His Arg Ile Leu Glu Gly Leu Ala Ala Ser Asn
945 950 955 960

Val Ala Leu Ala Arg Gly Ala Leu Ala Ala Arg Gly Ile Leu Glu Gly
965 970 975

Leu Asn Ala Ser Pro Ala Arg Gly Gly Leu Ala Gly Leu Tyr Ile Leu
980 985 990

Glu Pro Arg Ala Pro Arg Ala Ala Ser Pro Gly Leu Asn Gly Leu Asn
995 1000 1005

Ala Arg Gly Leu Glu Ala Ile Leu Glu Pro His Glu Ala Leu Ala Gly
1010 1015 1020

Leu Tyr Ala Arg Gly Gly Leu Asn Leu Glu Ala Gly Leu Ala Ala Ser
1025 1030 1035 1040

Pro Gly Leu Tyr Ala Arg Gly Thr His Arg Leu Glu Ala Ser Glu Arg
1045 1050 1055

Ala Ser Pro Thr Tyr Arg Ala Ser Asn Ile Leu Glu Gly Leu Asn Ala
1060 1065 1070

Arg Gly Gly Leu Ala Ser Glu Arg Thr His Arg Leu Glu Ala His Ile
1075 1080 1085

Ser Leu Glu Ala Val Ala Leu Leu Glu Ala Ala Arg Gly Leu Glu Ala
1090 1095 1100

Ala Arg Gly Gly Leu Tyr Gly Leu Tyr Ala Ser Pro
1105 1110 1115

Sequence listing

<210> 19
 <211> 1116
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> His-SUMO- hGH-Ub(A)

<400> 19
 Met Glu Thr Gly Leu Tyr His Ile Ser His Ile Ser His Ile Ser His
 1 5 10 15

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

Asn Gly Leu Ala Ala Leu Ala Leu Tyr Ser Pro Arg Ala Ser Glu Arg
 35 40 45

Thr His Arg Gly Leu Ala Ala Ser Pro Leu Glu Ala Gly Leu Tyr Ala
 50 55 60

Ser Pro Leu Tyr Ser Leu Tyr Ser Gly Leu Ala Gly Leu Tyr Gly Leu
 65 70 75 80

Ala Thr Tyr Arg Ile Leu Glu Leu Tyr Ser Leu Glu Ala Leu Tyr Ser
 85 90 95

Val Ala Leu Ile Leu Glu Gly Leu Tyr Gly Leu Asn Ala Ser Pro Ser
 100 105 110

Glu Arg Ser Glu Arg Gly Leu Ala Ile Leu Glu His Ile Ser Pro His
 115 120 125

Glu Leu Tyr Ser Val Ala Leu Leu Tyr Ser Met Glu Thr Thr His Arg
 130 135 140

Thr His Arg His Ile Ser Leu Glu Ala Leu Tyr Ser Leu Tyr Ser Leu
 145 150 155 160

Sequence listing

Glu Ala Leu Tyr Ser Gly Leu Ala Ser Glu Arg Thr Tyr Arg Cys Tyr
165 170 175

Ser Gly Leu Asn Ala Arg Gly Gly Leu Asn Gly Leu Tyr Val Ala Leu
180 185 190

Pro Arg Ala Met Glu Thr Ala Ser Asn Ser Glu Arg Leu Glu Ala Ala
195 200 205

Arg Gly Pro His Glu Leu Glu Ala Pro His Glu Gly Leu Ala Gly Leu
210 215 220

Tyr Gly Leu Asn Ala Arg Gly Ile Leu Glu Ala Leu Ala Ala Ser Pro
225 230 235 240

Ala Ser Asn His Ile Ser Thr His Arg Pro Arg Ala Leu Tyr Ser Gly
245 250 255

Leu Ala Leu Glu Ala Gly Leu Tyr Met Glu Thr Gly Leu Ala Gly Leu
260 265 270

Ala Gly Leu Ala Ala Ser Pro Val Ala Leu Ile Leu Glu Gly Leu Ala
275 280 285

Val Ala Leu Thr Tyr Arg Gly Leu Asn Gly Leu Ala Gly Leu Asn Thr
290 295 300

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

Arg Ile Leu Glu Pro Arg Ala Leu Glu Ala Ser Glu Arg Ala Arg Gly
325 330 335

Leu Glu Ala Pro His Glu Ala Ser Pro Ala Ser Asn Ala Leu Ala Met
340 345 350

Glu Thr Leu Glu Ala Ala Arg Gly Ala Leu Ala His Ile Ser Ala Arg
355 360 365

Gly Leu Glu Ala His Ile Ser Gly Leu Asn Leu Glu Ala Ala Leu Ala

Sequence listing

370

375

380

Pro His Glu Ala Ser Pro Thr His Arg Thr Tyr Arg Gly Leu Asn Gly
385 390 395 400

Leu Ala Pro His Glu Gly Leu Ala Gly Leu Ala Ala Leu Ala Thr Tyr
405 410 415

Arg Ile Leu Glu Pro Arg Ala Leu Tyr Ser Gly Leu Ala Gly Leu Asn
420 425 430

Leu Tyr Ser Thr Tyr Arg Ser Glu Arg Pro His Glu Leu Glu Ala Gly
435 440 445

Leu Asn Ala Ser Asn Pro Arg Ala Gly Leu Asn Thr His Arg Ser Glu
450 455 460

Arg Leu Glu Ala Cys Tyr Ser Pro His Glu Ser Glu Arg Gly Leu Ala
465 470 475 480

Ser Glu Arg Ile Leu Glu Pro Arg Ala Thr His Arg Pro Arg Ala Ser
485 490 495

Glu Arg Ala Ser Asn Ala Arg Gly Gly Leu Ala Gly Leu Ala Thr His
500 505 510

Arg Gly Leu Asn Gly Leu Asn Leu Tyr Ser Ser Glu Arg Ala Ser Asn
515 520 525

Leu Glu Ala Gly Leu Ala Leu Glu Ala Leu Glu Ala Ala Arg Gly Ile
530 535 540

Leu Glu Ser Glu Arg Leu Glu Ala Leu Glu Ala Leu Glu Ala Ile Leu
545 550 555 560

Glu Gly Leu Asn Ser Glu Arg Thr Arg Pro Leu Glu Ala Gly Leu Ala
565 570 575

Pro Arg Ala Val Ala Leu Gly Leu Asn Pro His Glu Leu Glu Ala Ala
580 585 590

Sequence listing

Arg Gly Ser Glu Arg Val Ala Leu Pro His Glu Ala Leu Ala Ala Ser
595 600 605

Asn Ser Glu Arg Leu Glu Ala Val Ala Leu Thr Tyr Arg Gly Leu Tyr
610 615 620

Ala Leu Ala Ser Glu Arg Ala Ser Pro Ser Glu Arg Ala Ser Asn Val
625 630 635 640

Ala Leu Thr Tyr Arg Ala Ser Pro Leu Glu Ala Leu Glu Ala Leu Tyr
645 650 655

Ser Ala Ser Pro Leu Glu Ala Gly Leu Ala Gly Leu Ala Gly Leu Tyr
660 665 670

Ile Leu Glu Gly Leu Asn Thr His Arg Leu Glu Ala Met Glu Thr Gly
675 680 685

Leu Tyr Ala Arg Gly Leu Glu Ala Gly Leu Ala Ala Ser Pro Gly Leu
690 695 700

Tyr Ser Glu Arg Pro Arg Ala Ala Arg Gly Thr His Arg Gly Leu Tyr
705 710 715 720

Gly Leu Asn Ile Leu Glu Pro His Glu Leu Tyr Ser Gly Leu Asn Thr
725 730 735

His Arg Thr Tyr Arg Ser Glu Arg Leu Tyr Ser Pro His Glu Ala Ser
740 745 750

Pro Thr His Arg Ala Ser Asn Ser Glu Arg His Ile Ser Ala Ser Asn
755 760 765

Ala Ser Pro Ala Ser Pro Ala Leu Ala Leu Glu Ala Leu Glu Ala Leu
770 775 780

Tyr Ser Ala Ser Asn Thr Tyr Arg Gly Leu Tyr Leu Glu Ala Leu Glu
785 790 795 800

Ala Thr Tyr Arg Cys Tyr Ser Pro His Glu Ala Arg Gly Leu Tyr Ser
805 810 815

Sequence listing

Ala Ser Pro Met Glu Thr Ala Ser Pro Leu Tyr Ser Val Ala Leu Gly
820 825 830

Leu Ala Thr His Arg Pro His Glu Leu Glu Ala Ala Arg Gly Ile Leu
835 840 845

Glu Val Ala Leu Gly Leu Asn Cys Tyr Ser Ala Arg Gly Ser Glu Arg
850 855 860

Val Ala Leu Gly Leu Ala Gly Leu Tyr Ser Glu Arg Cys Tyr Ser Gly
865 870 875 880

Leu Tyr Pro His Glu Met Glu Thr Gly Leu Asn Ile Leu Glu Pro His
885 890 895

Glu Val Ala Leu Ala Arg Gly Thr His Arg Leu Glu Ala Thr His Arg
900 905 910

Gly Leu Tyr Ala Arg Gly Thr His Arg Ile Leu Glu Thr His Arg Leu
915 920 925

Glu Ala Gly Leu Ala Val Ala Leu Gly Leu Ala Pro Arg Ala Ser Glu
930 935 940

Arg Ala Ser Pro Thr His Arg Ile Leu Glu Gly Leu Ala Ala Ser Asn
945 950 955 960

Val Ala Leu Ala Arg Gly Ala Leu Ala Ala Arg Gly Ile Leu Glu Gly
965 970 975

Leu Asn Ala Ser Pro Ala Arg Gly Gly Leu Ala Gly Leu Tyr Ile Leu
980 985 990

Glu Pro Arg Ala Pro Arg Ala Ala Ser Pro Gly Leu Asn Gly Leu Asn
995 1000 1005

Ala Arg Gly Leu Glu Ala Ile Leu Glu Pro His Glu Ala Leu Ala Gly
1010 1015 1020

Leu Tyr Ala Arg Gly Gly Leu Asn Leu Glu Ala Gly Leu Ala Ala Ser

Sequence listing

1025 1030 1035 1040
Pro Gly Leu Tyr Ala Arg Gly Thr His Arg Leu Glu Ala Ser Glu Arg
 1045 1050 1055
Ala Ser Pro Thr Tyr Arg Ala Ser Asn Ile Leu Glu Gly Leu Asn Leu
 1060 1065 1070
Tyr Ser Gly Leu Ala Ser Glu Arg Thr His Arg Leu Glu Ala His Ile
 1075 1080 1085
Ser Leu Glu Ala Val Ala Leu Leu Glu Ala Ala Arg Gly Pro Arg Ala
 1090 1095 1100
Ala Arg Gly Gly Leu Tyr Gly Leu Tyr Ala Ser Pro
1105 1110 1115

<210> 20
<211> 804
<212> PRT
<213> Artificial Sequence

<220>
<223> Ub(A)-hGH

<400> 20
Met Glu Thr Gly Leu Asn Ile Leu Glu Pro His Glu Val Ala Leu Ala
1 5 10 15

Arg Gly Thr His Arg Leu Glu Ala Thr His Arg Gly Leu Tyr Ala Arg
 20 25 30

Gly Thr His Arg Ile Leu Glu Thr His Arg Leu Glu Ala Gly Leu Ala
 35 40 45

Val Ala Leu Gly Leu Ala Pro Arg Ala Ser Glu Arg Ala Ser Pro Thr
 50 55 60

His Arg Ile Leu Glu Gly Leu Ala Ala Ser Asn Val Ala Leu Ala Arg

Sequence listing

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

Sequence listing

Leu Glu Ala His Ile Ser Gly Leu Asn Leu Glu Ala Ala Leu Ala Pro
290 295 300

His Glu Ala Ser Pro Thr His Arg Thr Tyr Arg Gly Leu Asn Gly Leu
305 310 315 320

Ala Pro His Glu Gly Leu Ala Gly Leu Ala Ala Leu Ala Thr Tyr Arg
325 330 335

Ile Leu Glu Pro Arg Ala Leu Tyr Ser Gly Leu Ala Gly Leu Asn Leu
340 345 350

Tyr Ser Thr Tyr Arg Ser Glu Arg Pro His Glu Leu Glu Ala Gly Leu
355 360 365

Asn Ala Ser Asn Pro Arg Ala Gly Leu Asn Thr His Arg Ser Glu Arg
370 375 380

Leu Glu Ala Cys Tyr Ser Pro His Glu Ser Glu Arg Gly Leu Ala Ser
385 390 395 400

Glu Arg Ile Leu Glu Pro Arg Ala Thr His Arg Pro Arg Ala Ser Glu
405 410 415

Arg Ala Ser Asn Ala Arg Gly Gly Leu Ala Gly Leu Ala Thr His Arg
420 425 430

Gly Leu Asn Gly Leu Asn Leu Tyr Ser Ser Glu Arg Ala Ser Asn Leu
435 440 445

Glu Ala Gly Leu Ala Leu Glu Ala Leu Glu Ala Ala Arg Gly Ile Leu
450 455 460

Glu Ser Glu Arg Leu Glu Ala Leu Glu Ala Leu Glu Ala Ile Leu Glu
465 470 475 480

Gly Leu Asn Ser Glu Arg Thr Arg Pro Leu Glu Ala Gly Leu Ala Pro
485 490 495

Arg Ala Val Ala Leu Gly Leu Asn Pro His Glu Leu Glu Ala Ala Arg
500 505 510

Sequence listing

Gly Ser Glu Arg Val Ala Leu Pro His Glu Ala Leu Ala Ala Ser Asn
515 520 525

Ser Glu Arg Leu Glu Ala Val Ala Leu Thr Tyr Arg Gly Leu Tyr Ala
530 535 540

Leu Ala Ser Glu Arg Ala Ser Pro Ser Glu Arg Ala Ser Asn Val Ala
545 550 555 560

Leu Thr Tyr Arg Ala Ser Pro Leu Glu Ala Leu Glu Ala Leu Tyr Ser
565 570 575

Ala Ser Pro Leu Glu Ala Gly Leu Ala Gly Leu Ala Gly Leu Tyr Ile
580 585 590

Leu Glu Gly Leu Asn Thr His Arg Leu Glu Ala Met Glu Thr Gly Leu
595 600 605

Tyr Ala Arg Gly Leu Glu Ala Gly Leu Ala Ala Ser Pro Gly Leu Tyr
610 615 620

Ser Glu Arg Pro Arg Ala Ala Arg Gly Thr His Arg Gly Leu Tyr Gly
625 630 635 640

Leu Asn Ile Leu Glu Pro His Glu Leu Tyr Ser Gly Leu Asn Thr His
645 650 655

Arg Thr Tyr Arg Ser Glu Arg Leu Tyr Ser Pro His Glu Ala Ser Pro
660 665 670

Thr His Arg Ala Ser Asn Ser Glu Arg His Ile Ser Ala Ser Asn Ala
675 680 685

Ser Pro Ala Ser Pro Ala Leu Ala Leu Glu Ala Leu Glu Ala Leu Tyr
690 695 700

Ser Ala Ser Asn Thr Tyr Arg Gly Leu Tyr Leu Glu Ala Leu Glu Ala
705 710 715 720

Thr Tyr Arg Cys Tyr Ser Pro His Glu Ala Arg Gly Leu Tyr Ser Ala

Sequence listing

725

730

735

Ser Pro Met Glu Thr Ala Ser Pro Leu Tyr Ser Val Ala Leu Gly Leu
740 745 750

Ala Thr His Arg Pro His Glu Leu Glu Ala Ala Arg Gly Ile Leu Glu
755 760 765

Val Ala Leu Gly Leu Asn Cys Tyr Ser Ala Arg Gly Ser Glu Arg Val
770 775 780

Ala Leu Gly Leu Ala Gly Leu Tyr Ser Glu Arg Cys Tyr Ser Gly Leu
785 790 795 800

Tyr Pro His Glu

<210> 21

<211> 1116

<212> PRT

<213> Artificial Sequence

<220>

<223> SUMO-Ub(A)-hGH

<400> 21

Met Glu Thr Gly Leu Tyr His Ile Ser His Ile Ser His Ile Ser His
1 5 10 15

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

Asn Gly Leu Ala Ala Leu Ala Leu Tyr Ser Pro Arg Ala Ser Glu Arg
35 40 45

Thr His Arg Gly Leu Ala Ala Ser Pro Leu Glu Ala Gly Leu Tyr Ala
50 55 60

Ser Pro Leu Tyr Ser Leu Tyr Ser Gly Leu Ala Gly Leu Tyr Gly Leu

Sequence listing

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

Sequence listing

Val Ala Leu Thr Tyr Arg Gly Leu Asn Gly Leu Ala Gly Leu Asn Thr
290 295 300

His Arg Gly Leu Tyr Gly Leu Tyr Met Glu Thr Gly Leu Asn Ile Leu
305 310 315 320

Glu Pro His Glu Val Ala Leu Ala Arg Gly Thr His Arg Leu Glu Ala
325 330 335

Thr His Arg Gly Leu Tyr Ala Arg Gly Thr His Arg Ile Leu Glu Thr
340 345 350

His Arg Leu Glu Ala Gly Leu Ala Val Ala Leu Gly Leu Ala Pro Arg
355 360 365

Ala Ser Glu Arg Ala Ser Pro Thr His Arg Ile Leu Glu Gly Leu Ala
370 375 380

Ala Ser Asn Val Ala Leu Ala Arg Gly Ala Leu Ala Ala Arg Gly Ile
385 390 395 400

Leu Glu Gly Leu Asn Ala Ser Pro Ala Arg Gly Gly Leu Ala Gly Leu
405 410 415

Tyr Ile Leu Glu Pro Arg Ala Pro Arg Ala Ala Ser Pro Gly Leu Asn
420 425 430

Gly Leu Asn Ala Arg Gly Leu Glu Ala Ile Leu Glu Pro His Glu Ala
435 440 445

Leu Ala Gly Leu Tyr Leu Tyr Ser Gly Leu Asn Leu Glu Ala Gly Leu
450 455 460

Ala Ala Ser Pro Gly Leu Tyr Ala Arg Gly Thr His Arg Leu Glu Ala
465 470 475 480

Ser Glu Arg Ala Ser Pro Thr Tyr Arg Ala Ser Asn Ile Leu Glu Gly
485 490 495

Leu Asn Ala Arg Gly Gly Leu Ala Ser Glu Arg Thr His Arg Leu Glu
500 505 510

Sequence listing

Ala His Ile Ser Leu Glu Ala Val Ala Leu Leu Glu Ala Ala Arg Gly
515 520 525

Pro Arg Ala Ala Arg Gly Gly Leu Tyr Gly Leu Tyr Ala Ser Pro Pro
530 535 540

His Glu Pro Arg Ala Thr His Arg Ile Leu Glu Pro Arg Ala Leu Glu
545 550 555 560

Ala Ser Glu Arg Ala Arg Gly Leu Glu Ala Pro His Glu Ala Ser Pro
565 570 575

Ala Ser Asn Ala Leu Ala Met Glu Thr Leu Glu Ala Ala Arg Gly Ala
580 585 590

Leu Ala His Ile Ser Ala Arg Gly Leu Glu Ala His Ile Ser Gly Leu
595 600 605

Asn Leu Glu Ala Ala Leu Ala Pro His Glu Ala Ser Pro Thr His Arg
610 615 620

Thr Tyr Arg Gly Leu Asn Gly Leu Ala Pro His Glu Gly Leu Ala Gly
625 630 635 640

Leu Ala Ala Leu Ala Thr Tyr Arg Ile Leu Glu Pro Arg Ala Leu Tyr
645 650 655

Ser Gly Leu Ala Gly Leu Asn Leu Tyr Ser Thr Tyr Arg Ser Glu Arg
660 665 670

Pro His Glu Leu Glu Ala Gly Leu Asn Ala Ser Asn Pro Arg Ala Gly
675 680 685

Leu Asn Thr His Arg Ser Glu Arg Leu Glu Ala Cys Tyr Ser Pro His
690 695 700

Glu Ser Glu Arg Gly Leu Ala Ser Glu Arg Ile Leu Glu Pro Arg Ala
705 710 715 720

Thr His Arg Pro Arg Ala Ser Glu Arg Ala Ser Asn Ala Arg Gly Gly

Sequence listing

725	730	735
Leu Ala Gly Leu Ala Thr His Arg Gly Leu Asn Gly Leu Asn Leu Tyr		
740	745	750
Ser Ser Glu Arg Ala Ser Asn Leu Glu Ala Gly Leu Ala Leu Glu Ala		
755	760	765
Leu Glu Ala Ala Arg Gly Ile Leu Glu Ser Glu Arg Leu Glu Ala Leu		
770	775	780
Glu Ala Leu Glu Ala Ile Leu Glu Gly Leu Asn Ser Glu Arg Thr Arg		
785	790	795
Pro Leu Glu Ala Gly Leu Ala Pro Arg Ala Val Ala Leu Gly Leu Asn		
805	810	815
Pro His Glu Leu Glu Ala Ala Arg Gly Ser Glu Arg Val Ala Leu Pro		
820	825	830
His Glu Ala Leu Ala Ala Ser Asn Ser Glu Arg Leu Glu Ala Val Ala		
835	840	845
Leu Thr Tyr Arg Gly Leu Tyr Ala Leu Ala Ser Glu Arg Ala Ser Pro		
850	855	860
Ser Glu Arg Ala Ser Asn Val Ala Leu Thr Tyr Arg Ala Ser Pro Leu		
865	870	875
Glu Ala Leu Glu Ala Leu Tyr Ser Ala Ser Pro Leu Glu Ala Gly Leu		
885	890	895
Ala Gly Leu Ala Gly Leu Tyr Ile Leu Glu Gly Leu Asn Thr His Arg		
900	905	910
Leu Glu Ala Met Glu Thr Gly Leu Tyr Ala Arg Gly Leu Glu Ala Gly		
915	920	925
Leu Ala Ala Ser Pro Gly Leu Tyr Ser Glu Arg Pro Arg Ala Ala Arg		
930	935	940

Sequence listing

Gly Thr His Arg Gly Leu Tyr Gly Leu Asn Ile Leu Glu Pro His Glu
945 950 955 960

Leu Tyr Ser Gly Leu Asn Thr His Arg Thr Tyr Arg Ser Glu Arg Leu
965 970 975

Tyr Ser Pro His Glu Ala Ser Pro Thr His Arg Ala Ser Asn Ser Glu
980 985 990

Arg His Ile Ser Ala Ser Asn Ala Ser Pro Ala Ser Pro Ala Leu Ala
995 1000 1005

Leu Glu Ala Leu Glu Ala Leu Tyr Ser Ala Ser Asn Thr Tyr Arg Gly
1010 1015 1020

Leu Tyr Leu Glu Ala Leu Glu Ala Thr Tyr Arg Cys Tyr Ser Pro His
1025 1030 1035 1040

Glu Ala Arg Gly Leu Tyr Ser Ala Ser Pro Met Glu Thr Ala Ser Pro
1045 1050 1055

Leu Tyr Ser Val Ala Leu Gly Leu Ala Thr His Arg Pro His Glu Leu
1060 1065 1070

Glu Ala Ala Arg Gly Ile Leu Glu Val Ala Leu Gly Leu Asn Cys Tyr
1075 1080 1085

Ser Ala Arg Gly Ser Glu Arg Val Ala Leu Gly Leu Ala Gly Leu Tyr
1090 1095 1100

Ser Glu Arg Cys Tyr Ser Gly Leu Tyr Pro His Glu
1105 1110 1115

<210> 22
<211> 60
<212> DNA
<213> Artificial Sequence

<220>
<223> Signal peptide (IgGk)

Sequence listing

<400> 22
 atggaaactg atactctgct gctgtgggtg ctgctgctgt gggtgcccgg ctcaactggt 60
 60

<210> 23
 <211> 231
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Ub (A)

<400> 23
 atgcagatct tcgtgaggac cctgacagat cggaccatca cactggaggt ggagccaagc 60
 gagaccatcg agaacgtgag ggccagaatc caggaccggg agggcatccc cctgatcag 120
 cagagactga tcttcgctgg ccgccagctg gaggacggaa ggaccctgag cgattacaat 180
 atccagaaaag agtctacact gcacctggtg ctgagaccgc gcgtcgtgga t 231

<210> 24
 <211> 36
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Hinge (IgG1)

<400> 24
 gagccaaaat cttgtgacaa aactcatata tgtccc 36

<210> 25

Sequence listing

<211> 660
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Fc (IgG1)

<400> 25
 ccatgtcccg cacctgaact gctgggcgga cctagcgtgt ttctgttccc acctaagcca 60
 aaggacaccc tgatgatctc caggaccccc gaggtgacat gcgtgggtgg ggacgtgagc 120
 cacgaggacc ccgaggtgaa gttcaactgg tacgtggatg gcgtggaggt gcataatgcc 180
 aagacaaagc caaggaggga gcagtacaac agcacctatc ggggtgggtgc tgtgctgaca 240
 gtgctgcacc aggactggct gaacggcaag gagtataagt gcaaggtgtc taataaggcc 300
 ctgcccgtc ctatcgagaa gaccatctcc aaggccaagg gccagccaag agagccccag 360
 gtgtacacac tgccccctag ccgcgacgag ctgaccaaga accaggtgtc tctgacatgt 420
 ctggtgaagg gcttctatcc ttctgatatc gctgtggagt gggagtcaa tggccagcca 480
 gagaacaatt acaagaccac accacccgtg ctggactctg atggctcctt ctttctgtat 540
 tccaagctga ccgtggataa gagcagatgg cagcagggca acgtgttctc ctgtagcgtg 600
 atgcatgaag cactgcataa tcactatacc cagaagtcac tgtcactgag tcccggtaaa 660

660

<210> 26
 <211> 20
 <212> PRT
 <213> Artificial Sequence

<220>
 <223> Signal peptide (IgGk)

Sequence listing

<400> 26

Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro
 1 5 10 15

Gly Ser Thr Gly
 20

<210> 27

<211> 77

<212> PRT

<213> Artificial Sequence

<220>

<223> Ub(A)

<400> 27

Met Gln Ile Phe Val Arg Thr Leu Thr Asp Arg Thr Ile Thr Leu Glu
 1 5 10 15

Val Glu Pro Ser Asp Thr Ile Glu Asn Val Arg Ala Arg Ile Gln Asp
 20 25 30

Arg Glu Gly Ile Pro Pro Asp Gln Gln Arg Leu Ile Phe Ala Gly Arg
 35 40 45

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

Ser Thr Leu His Leu Val Leu Arg Pro Arg Val Val Asp
 65 70 75

<210> 28

<211> 12

<212> PRT

<213> Artificial Sequence

Sequence listing

<220>

<223> Hinge (IgG1)

<400> 28

Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro

1

5

10

<210> 29

<211> 660

<212> PRT

<213> Artificial Sequence

<220>

<223> Fc (IgG1)

<400> 29

Pro Arg Ala Cys Tyr Ser Pro Arg Ala Ala Leu Ala Pro Arg Ala Gly

1

5

10

15

Leu Ala Leu Glu Ala Leu Glu Ala Gly Leu Tyr Gly Leu Tyr Pro Arg

20

25

30

Ala Ser Glu Arg Val Ala Leu Pro His Glu Leu Glu Ala Pro His Glu

35

40

45

Pro Arg Ala Pro Arg Ala Leu Tyr Ser Pro Arg Ala Leu Tyr Ser Ala

50

55

60

Ser Pro Thr His Arg Leu Glu Ala Met Glu Thr Ile Leu Glu Ser Glu

65

70

75

80

Arg Ala Arg Gly Thr His Arg Pro Arg Ala Gly Leu Ala Val Ala Leu

85

90

95

Thr His Arg Cys Tyr Ser Val Ala Leu Val Ala Leu Val Ala Leu Ala

100

105

110

Ser Pro Val Ala Leu Ser Glu Arg His Ile Ser Gly Leu Ala Ala Ser

Sequence listing

115

120

125

Pro Pro Arg Ala Gly Leu Ala Val Ala Leu Leu Tyr Ser Pro His Glu
130 135 140

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

Leu Tyr Val Ala Leu Gly Leu Ala Val Ala Leu His Ile Ser Ala Ser
165 170 175

Asn Ala Leu Ala Leu Tyr Ser Thr His Arg Leu Tyr Ser Pro Arg Ala
180 185 190

Ala Arg Gly Gly Leu Ala Gly Leu Ala Gly Leu Asn Thr Tyr Arg Ala
195 200 205

Ser Asn Ser Glu Arg Thr His Arg Thr Tyr Arg Ala Arg Gly Val Ala
210 215 220

Leu Val Ala Leu Ser Glu Arg Val Ala Leu Leu Glu Ala Thr His Arg
225 230 235 240

Val Ala Leu Leu Glu Ala His Ile Ser Gly Leu Asn Ala Ser Pro Thr
245 250 255

Arg Pro Leu Glu Ala Ala Ser Asn Gly Leu Tyr Leu Tyr Ser Gly Leu
260 265 270

Ala Thr Tyr Arg Leu Tyr Ser Cys Tyr Ser Leu Tyr Ser Val Ala Leu
275 280 285

Ser Glu Arg Ala Ser Asn Leu Tyr Ser Ala Leu Ala Leu Glu Ala Pro
290 295 300

Arg Ala Ala Leu Ala Pro Arg Ala Ile Leu Glu Gly Leu Ala Leu Tyr
305 310 315 320

Ser Thr His Arg Ile Leu Glu Ser Glu Arg Leu Tyr Ser Ala Leu Ala
325 330 335

Sequence listing

Leu Tyr Ser Gly Leu Tyr Gly Leu Asn Pro Arg Ala Ala Arg Gly Gly
340 345 350

Leu Ala Pro Arg Ala Gly Leu Asn Val Ala Leu Thr Tyr Arg Thr His
355 360 365

Arg Leu Glu Ala Pro Arg Ala Pro Arg Ala Ser Glu Arg Ala Arg Gly
370 375 380

Ala Ser Pro Gly Leu Ala Leu Glu Ala Thr His Arg Leu Tyr Ser Ala
385 390 395 400

Ser Asn Gly Leu Asn Val Ala Leu Ser Glu Arg Leu Glu Ala Thr His
405 410 415

Arg Cys Tyr Ser Leu Glu Ala Val Ala Leu Leu Tyr Ser Gly Leu Tyr
420 425 430

Pro His Glu Thr Tyr Arg Pro Arg Ala Ser Glu Arg Ala Ser Pro Ile
435 440 445

Leu Glu Ala Leu Ala Val Ala Leu Gly Leu Ala Thr Arg Pro Gly Leu
450 455 460

Ala Ser Glu Arg Ala Ser Asn Gly Leu Tyr Gly Leu Asn Pro Arg Ala
465 470 475 480

Gly Leu Ala Ala Ser Asn Ala Ser Asn Thr Tyr Arg Leu Tyr Ser Thr
485 490 495

His Arg Thr His Arg Pro Arg Ala Pro Arg Ala Val Ala Leu Leu Glu
500 505 510

Ala Ala Ser Pro Ser Glu Arg Ala Ser Pro Gly Leu Tyr Ser Glu Arg
515 520 525

Pro His Glu Pro His Glu Leu Glu Ala Thr Tyr Arg Ser Glu Arg Leu
530 535 540

Tyr Ser Leu Glu Ala Thr His Arg Val Ala Leu Ala Ser Pro Leu Tyr
545 550 555 560

Sequence listing

Ser Ser Glu Arg Ala Arg Gly Thr Arg Pro Gly Leu Asn Gly Leu Asn
565 570 575

Gly Leu Tyr Ala Ser Asn Val Ala Leu Pro His Glu Ser Glu Arg Cys
580 585 590

Tyr Ser Ser Glu Arg Val Ala Leu Met Glu Thr His Ile Ser Gly Leu
595 600 605

Ala Ala Leu Ala Leu Glu Ala His Ile Ser Ala Ser Asn His Ile Ser
610 615 620

Thr Tyr Arg Thr His Arg Gly Leu Asn Leu Tyr Ser Ser Glu Arg Leu
625 630 635 640

Glu Ala Ser Glu Arg Leu Glu Ala Ser Glu Arg Pro Arg Ala Gly Leu
645 650 655

Tyr Leu Tyr Ser
660