<110> GENENTECH, INC.
Bhakta, Sunil
Junutula, Jagath Reddy

<120> CYSTEINE ENGINEERED ANTIBODIES AND CONJUGATES

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<150> US 61/352,728
<151> 2010-06-08

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Cys Asp Lys Thr His Thr Gly Gly Gly Ser Gln Arg Leu Met Glu
1 5 10 15

Asp Ile Cys Leu Pro Arg Trp Gly Cys Leu Trp Glu Asp Asp Phe
20 25 30

<210> 2
<211> 20
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<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 2
Gln Arg Leu Met Glu Asp Ile Cys Leu Pro Arg Trp Gly Cys Leu
1 5 10 15

Trp Glu Asp Asp Phe
20

<210> 3
<211> 20
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 3
Gln Arg Leu Ile Glu Asp Ile Cys Leu Pro Arg Trp Gly Cys Leu
1 5 10 15

Trp Glu Asp Asp Phe
20

<210> 4
<211> 18
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<213> Artificial sequence

<220>

<223> chemically synthesized

<400> 4
Arg Leu Ile Glu Asp Ile Cys Leu Pro Arg Trp Gly Cys Leu Trp
1 5 10 15

Glu Asp Asp

<210> 5
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 5
Asp Ile Cys Leu Pro Arg Trp Gly Cys Leu Trp
1 5 10

<210> 6
<211> 450
<212> PRT
<213> Artificial sequence

<220>
<223> artificial protein

<400> 6
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asn Ile Lys
20 25 30

Asp Thr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
35 40 45

Glu Trp Val Ala Arg Ile Tyr Pro Thr Asn Gly Tyr Thr Arg Tyr
50 55 60

Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Ala Asp Thr Ser
65 70 75

Lys Asn Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg Cys Glu Asp
80 85 90

Thr Ala Val Tyr Tyr Cys Ser Arg Trp Gly Gly Asp Gly Phe Tyr
95 100 105

Ala Met Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
110 115 120

Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
125 130 135

Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys
140 145 150

Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
155 160 165

Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
170 175 180

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
185 190 195

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Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
                200                 205                 210

Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
                215                 220                 225

Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
                230                 235                 240

Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
                245                 250                 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
                260                 265                 270

His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
                275                 280                 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
                290                 295                 300

Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
                305                 310                 315

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
                320                 325                 330

Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
                335                 340                 345

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
                350                 355                 360

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
                365                 370                 375

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro
                380                 385                 390

Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
                395                 400                 405

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                410                 415                 420

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
                425                 430                 435

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                440                 445                 450

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<220>
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   1               5                  10                  15

 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Asn Ile Lys
                20                  25                  30

 Asp Thr Tyr Ile His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
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35 40 45

Glu Trp Val Ala Arg Ile Tyr Pro Thr Asn Gly Tyr Thr Arg Tyr
50 55 60

Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Ala Asp Thr Ser
65 70 75

Lys Asn Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
80 85 90

Thr Ala Val Tyr Tyr Cys Ser Arg Trp Gly Gly Asp Gly Phe Tyr
95 100 105

Ala Met Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
110 115 120

Cys Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
125 130 135

Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys
140 145 150

Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
155 160 165

Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser
170 175 180

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
185 190 195

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
200 205 210

Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
215 220 225

Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
230 235 240

Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
245 250 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
260 265 270

His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
275 280 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
290 295 300

Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
305 310 315

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
320 325 330

Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
335 340 345

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
350 355 360

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
365 370 375

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Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro
                380                 385                 390

Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
                395                 400                 405

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
                410                 415                 420

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
                425                 430                 435

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
                440                 445                 450
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<210> 8
<211> 214
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 8

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

 Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Asp Val Asn
                20                  25                  30

 Thr Ala Val Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
                35                  40                  45

 Leu Leu Ile Tyr Ser Ala Ser Phe Leu Tyr Ser Gly Val Pro Ser
                50                  55                  60

 Arg Phe Ser Gly Ser Arg Ser Gly Thr Asp Phe Thr Leu Thr Ile
                65                  70                  75

 Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
                80                  85                  90

 His Tyr Thr Thr Pro Pro Thr Phe Gly Gln Gly Thr Lys Val Glu
                95                 100                 105

 Ile Lys Arg Thr Cys Ala Ala Pro Ser Val Phe Ile Phe Pro Pro
                110                 115                 120

 Ser Asp Glu Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu
                125                 130                 135

 Leu Asn Asn Phe Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val
                140                 145                 150

 Asp Asn Ala Leu Gln Ser Gly Asn Ser Gln Glu Ser Val Thr Glu
                155                 160                 165

 Gln Asp Ser Lys Asp Ser Thr Tyr Ser Leu Ser Ser Thr Leu Thr
                170                 175                 180

 Leu Ser Lys Ala Asp Tyr Glu Lys His Lys Val Tyr Ala Cys Glu
                185                 190                 195

 Val Thr His Gln Gly Leu Ser Ser Pro Val Thr Lys Ser Phe Asn
                200                 205                 210

 Arg Gly Glu Cys
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<210> 9
<211> 10
<212> PRT
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<220>
<223> chemically synthesized

<400> 9
Trp Val Arg Gln Cys Pro Gly Lys Gly Leu
1 5 10

<210> 10
<211> 10
<212> PRT
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<220>
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<400> 10
Asn Ser Leu Arg Cys Glu Asp Thr Ala Val
1 5 10

<210> 11
<211> 13
<212> PRT
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<220>
<223> chemically synthesized

<400> 11
Leu Val Thr Val Cys Ser Ala Ser Thr Lys Gly Pro Ser
1 5 10

<210> 12
<211> 13
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<400> 12
Leu Val Thr Val Ser Cys Ala Ser Thr Lys Gly Pro Ser
1 5 10

<210> 13
<211> 13
<212> PRT
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<220>
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<400> 13
Leu Val Thr Val Ser Ser Cys Ser Thr Lys Gly Pro Ser
1 5 10

<210> 14
<211> 13
<212> PRT
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<220>
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<400> 14
Leu Val Thr Val Ser Ser Ala Cys Thr Lys Gly Pro Ser
1 5 10

<210> 15
<211> 14
<212> PRT
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<220>
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<400> 15
His Thr Phe Pro Cys Val Leu Gln Ser Ser Gly Leu Tyr Ser
1 5 10

<210> 16
<211> 14
<212> PRT
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<220>
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<400> 16
His Thr Phe Pro Ala Val Leu Gln Cys Ser Gly Leu Tyr Ser
1 5 10

<210> 17
<211> 11
<212> PRT
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<220>
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<400> 17
Ser Leu Ser Ala Ser Cys Gly Asp Arg Val Thr
1 5 10

<210> 18
<211> 11
<212> PRT
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<220>
<223> chemically synthesized

<400> 18
Gln Lys Pro Gly Lys Cys Pro Lys Leu Leu Ile
1 5 10

<210> 19
<211> 11
<212> PRT
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<220>
<223> chemically synthesized

<400> 19
Glu Ile Lys Arg Thr Cys Ala Ala Pro Ser Val
1 5 10

<210> 20
<211> 12
<212> PRT

<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 20
Thr Cys Ala Ala Pro Cys Val Phe Ile Phe Pro Pro
1 5 10

<210> 21
<211> 11
<212> PRT
<213> Artificial sequence

<220>
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<400> 21
Phe Ile Phe Pro Pro Cys Asp Glu Gln Leu Lys
1 5 10

<210> 22
<211> 11
<212> PRT
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<220>
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<400> 22
Asp Glu Gln Leu Lys Cys Gly Thr Ala Ser Val
1 5 10

<210> 23
<211> 11
<212> PRT
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<220>
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<400> 23
Phe Tyr Pro Arg Glu Cys Lys Val Gln Trp Lys
1 5 10

<210> 24
<211> 11
<212> PRT
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<220>
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<400> 24
Trp Lys Val Asp Asn Cys Leu Gln Ser Gly Asn
1 5 10

<210> 25
<211> 11
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<220>
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<400> 25
Ala Leu Gln Ser Gly Cys Ser Gln Glu Ser Val
1 5 10

<210> 26
<211> 11
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<220>
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<400> 26
Val Thr Glu Gln Asp Cys Lys Asp Ser Thr Tyr
1 5 10

<210> 27
<211> 11
<212> PRT
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<220>
<223> chemically synthesized

<400> 27
Gly Leu Ser Ser Pro Cys Thr Lys Ser Phe Asn
1 5 10

<210> 28
<211> 450
<212> PRT
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<220>
<223> chemically synthesized

<400> 28
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Thr Phe Thr
20 25 30

Ser Tyr Trp Met His Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
35 40 45

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

Asn Gln Lys Phe Lys Asp Arg Phe Thr Ile Ser Ala Asp Thr Ser
65 70 75

Lys Asn Thr Ala Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
80 85 90

Thr Ala Val Tyr Tyr Cys Thr Arg Arg Pro Lys Ile Pro Arg His
95 100 105

Ala Asn Val Phe Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
110 115 120

Cys Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser
125 130 135

Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys
140 145 150

Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala
155 160 165

Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser

170 175 180

Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
185 190 195

Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser
200 205 210

Asn Thr Lys Val Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys
215 220 225

Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly
230 235 240

Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met
245 250 255

Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser
260 265 270

His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
275 280 285

Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn
290 295 300

Ser Thr Tyr Arg Val Val Ser Val Leu Thr Val Leu His Gln Asp
305 310 315

Trp Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala
320 325 330

Leu Pro Ala Pro Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln
335 340 345

Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu
350 355 360

Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe
365 370 375

Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro
380 385 390

Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly
395 400 405

Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp
410 415 420

Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
425 430 435

His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
440 445 450

<210> 29
<211> 25
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 29
His Glu Asp Pro Glu Cys Lys Phe Asn Trp Tyr Val Asp Gly Val
1 5 10 15

Glu Val His Asn Ala Lys Thr Lys Pro Arg
20 25

<210> 30
<211> 25
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 30
His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Cys Asp Gly Val
1 5 10 15

Glu Val His Asn Ala Lys Thr Lys Pro Arg
20 25

<210> 31
<211> 25
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 31
His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Cys
1 5 10 15

Glu Val His Asn Ala Lys Thr Lys Pro Arg
20 25

<210> 32
<211> 25
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<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 32
His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
1 5 10 15

Glu Cys His Asn Ala Lys Thr Lys Pro Arg
20 25

<210> 33
<211> 25
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 33
His Glu Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val
1 5 10 15

Glu Val His Asn Cys Lys Thr Lys Pro Arg
20 25

<210> 34
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 34
Tyr Lys Cys Lys Val Cys Asn Lys Ala Leu Pro
1 5 10

<210> 35
<211> 13
<212> PRT
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<220>
<223> artificial protein

<400> 35
Ile Glu Lys Thr Ile Cys Lys Ala Lys Gly Gln Pro Arg
1 5 10

<210> 36
<211> 13
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 36
Ile Glu Lys Thr Ile Ser Lys Cys Lys Gly Gln Pro Arg
1 5 10

<210> 37
<211> 11
<212> PRT
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<220>
<223> chemically synthesized

<400> 37
Lys Gly Phe Tyr Pro Cys Asp Ile Ala Val Glu
1 5 10

<210> 38
<211> 11
<212> PRT
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<220>
<223> chemically synthesized

<400> 38
Pro Pro Val Leu Asp Cys Asp Gly Ser Phe Phe
1 5 10

<210> 39
<211> 446
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 39
Asp Val Gln Leu Gln Glu Ser Gly Pro Gly Leu Val Asn Pro Ser
1 5 10 15

Gln Ser Leu Ser Leu Thr Cys Thr Val Thr Gly Tyr Ser Ile Thr

20 25 30

Asn Asp Tyr Ala Trp Asn Trp Ile Arg Gln Phe Pro Gly Asn Lys
35 40 45

Leu Glu Trp Met Gly Tyr Ile Asn Tyr Ser Gly Tyr Thr Thr Tyr
50 55 60

Asn Pro Ser Leu Lys Ser Arg Ile Ser Ile Thr Arg Asp Thr Ser
65 70 75

Lys Asn Gln Phe Phe Leu His Leu Asn Ser Val Thr Thr Glu Asp
80 85 90

Thr Ala Thr Tyr Tyr Cys Ala Arg Trp Asp Gly Gly Leu Thr Tyr
95 100 105

Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ala Cys Ser Thr Lys
110 115 120

Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys Ser Thr Ser
125 130 135

Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr Phe Pro
140 145 150

Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser Gly
155 160 165

Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
170 175 180

Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln
185 190 195

Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val
200 205 210

Asp Lys Lys Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys
215 220 225

Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe
230 235 240

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

Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro
260 265 270

Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn
275 280 285

Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg
290 295 300

Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly
305 310 315

Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro
320 325 330

Ile Glu Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro
335 340 345

Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn
350 355 360

Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
365 370 375

Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr
380 385 390

Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu
395 400 405

Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
410 415 420

Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr
425 430 435

Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
440 445

<210> 40
<211> 10
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 40
Asn Trp Ile Arg Gln Cys Pro Gly Asn Lys
1 5 10

<210> 41
<211> 11
<212> PRT
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<220>
<223> chemically synthesized

<400> 41
Leu Asn Ser Cys Thr Thr Glu Asp Thr Ala Thr
1 5 10

<210> 42
<211> 21
<212> PRT
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<220>
<223> chemically synthesized

<400> 42
Gly Gln Gly Thr Leu Val Thr Val Ser Ala Cys Ser Thr Lys Gly
1 5 10 15

Pro Ser Val Phe Pro Leu
20

<210> 43
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 43
His Thr Phe Pro Cys Val Leu Gln Ser Ser Gly Leu Tyr Ser
1 5 10

<210> 44
<211> 14
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 44
His Thr Phe Pro Ala Cys Leu Gln Ser Ser Gly Leu Tyr Ser
1 5 10

<210> 45
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 45
Phe Leu Ser Val Ser Cys Gly Gly Arg Val Thr
1 5 10

<210> 46
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 46
Gln Lys Pro Gly Asn Cys Pro Arg Leu Leu Ile
1 5 10

<210> 47
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 47
Glu Ile Lys Arg Thr Cys Ala Ala Pro Ser Val
1 5 10

<210> 48
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> artificial protein

<400> 48
Phe Tyr Pro Arg Glu Cys Lys Val Gln Trp Lys
1 5 10

<210> 49
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> chemically synthesized

<400> 49
Val Thr Glu Gln Asp Cys Lys Asp Ser Thr Tyr
1 5 10

<210> 50
<211> 9
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<220>
<223> sequence is synthesized

<400> 50
Glu Val Gln Cys Val Glu Ser Gly Gly
1 5

<210> 51
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 51
Gln Leu Val Glu Ser Cys Gly Gly Leu Val Gln
1 5 10

<210> 52
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 52
Val Glu Ser Gly Gly Cys Leu Val Gln Pro Gly
1 5 10

<210> 53
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 53
Gly Gly Ser Leu Arg Cys Ser Cys Ala Ala Ser
1 5 10

<210> 54
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 54
Leu Arg Leu Ser Cys Cys Ala Ser Gly Phe Asn
1 5 10

<210> 55
<211> 11
<212> PRT

<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 55
Ser Cys Ala Ala Ser Cys Phe Asn Ile Lys Asp
1 5 10

<210> 56
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 56
Cys Ala Ala Ser Gly Cys Asn Ile Lys Asp Thr
1 5 10

<210> 57
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 57
Phe Asn Ile Lys Asp Cys Tyr Ile His Trp Val
1 5 10

<210> 58
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 58
Ile His Trp Val Arg Cys Ala Pro Gly Lys Gly
1 5 10

<210> 59
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 59
Trp Val Arg Gln Ala Cys Gly Lys Gly Leu Glu
1 5 10

<210> 60
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 60
Arg Gln Ala Pro Gly Cys Gly Leu Glu Trp Val
1 5 10

<210> 61
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 61
Gln Ala Pro Gly Lys Cys Leu Glu Trp Val Ala
1 5 10

<210> 62
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 62
Gly Lys Gly Leu Glu Cys Val Ala Arg Ile Tyr
1 5 10

<210> 63
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 63
Thr Arg Tyr Ala Asp Cys Val Lys Gly Arg Phe
1 5 10

<210> 64
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 64
Ser Val Lys Gly Arg Cys Thr Ile Ser Ala Asp
1 5 10

<210> 65
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 65
Phe Thr Ile Ser Ala Cys Thr Ser Lys Asn Thr
1 5 10

<210> 66
<211> 11
<212> PRT
<213> Artificial sequence

<220>
<223> sequence is synthesized

<400> 66
Ser Ala Asp Thr Ser Cys Asn Thr Ala Tyr Leu
1 5 10

<210> 67
<211> 11
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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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1 5 10

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