<110> Prolor Biotech Inc.

<120> METHOD OF INCREASING THE HYDRODYNIAMIC VOLUME OF POLYPEPTIDES BY ATTACHING TO GONADOTROPHIN CARBOXY TERMINAL PEPTIDES

<130> P-76221-PC

<150> 61/728,662
<151> 2012-11-20

<160> 73

<170> PatentIn version 3.5

<210> 1
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<213> Artificial

<220>
<223> CTP sequence

<400> 1

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

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<213> Artificial

<220>
<223> CTP sequence

<400> 2

Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg
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Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
20 25

<210> 3
<211> 12
<212> PRT
<213> artificial

<220>
<223> Truncated CTP sequence

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Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro
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<210> 4
<211> 26

<212> PRT
<213> artificial

<220>
<223> hGH signal peptide

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Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
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Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala
20 25

<210> 5
<211> 217
<212> PRT
<213> Homo sapiens

<400> 5

Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1 5 10 15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Phe Pro Thr Ile Pro Leu
20 25 30

Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln
35 40 45

Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys
50 55 60

Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe
65 70 75 80

Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys
85 90 95

Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp
100 105 110

Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val
115 120 125

Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu
130 135 140

Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg
145 150 155 160

Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser
165 170 175

His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe

180 185 190

Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys
195 200 205

Arg Ser Val Glu Gly Ser Cys Gly Phe
210 215

<210> 6
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<220>
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<400> 6

Met Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe Asp Asn Ala Met Leu
1 5 10 15

Arg Ala His Arg Leu His Gln Leu Ala Phe Asp Thr Tyr Gln Glu Phe
20 25 30

Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr Ser Phe Leu Gln Asn
35 40 45

Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile Pro Thr Pro Ser Asn
50 55 60

Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu Leu Leu Arg Ile Ser
65 70 75 80

Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val Gln Phe Leu Arg Ser
85 90 95

Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser Asp Ser Asn Val Tyr
100 105 110

Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln Thr Leu Met Gly Arg
115 120 125

Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile Phe Lys Gln Thr Tyr
130 135 140

Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp Ala Leu Leu Lys Asn
145 150 155 160

Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met Asp Lys Val Glu Thr
165 170 175

Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu Gly Ser Cys Gly Phe
180 185 190

<210> 7
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<212> PRT
<213> Artificial

<220>
<223> hGH sequence

<400> 7

Met Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe Asp Asn Ala Met Leu
1 5 10 15

Arg Ala His Arg Leu His Gln Leu Ala
20 25

<210> 8
<211> 217
<212> PRT
<213> Homo sapiens

<400> 8

Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1 5 10 15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Phe Pro Thr Ile Pro Leu
20 25 30

Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln
35 40 45

Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys
50 55 60

Val Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe
65 70 75 80

Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys
85 90 95

Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp
100 105 110

Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val
115 120 125

Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu
130 135 140

Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg
145 150 155 160

Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser
165 170 175

```
His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe
            180                 185                 190

Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys
        195                 200                 205

Arg Ser Val Glu Gly Ser Cys Gly Phe
    210                 215
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<212> PRT
<213> Artificial

<220>
<223> hGH-CTP

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Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
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Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Phe Pro Thr Ile Pro Leu
            20                  25                  30

Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln
        35                  40                  45

Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys
    50                  55                  60

Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe
65                  70                  75                  80

Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys
                85                  90                  95

Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp
            100                 105                 110

Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val
        115                 120                 125

Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu
    130                 135                 140

Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg
145                 150                 155                 160

Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser
                165                 170                 175
```

```
His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe
            180                 185                 190

Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys
        195                 200                 205

Arg Ser Val Glu Gly Ser Cys Gly Phe Ser Ser Ser Ser Lys Ala Pro
    210                 215                 220

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
225                 230                 235                 240

Pro Ile Leu Pro Gln
                245
```

<210> 10
<211> 273
<212> PRT
<213> Artificial

<220>
<223> hGH-CTP-CTP

<400> 10

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Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1               5                   10                  15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Phe Pro Thr Ile Pro Leu
            20                  25                  30

Ser Arg Leu Phe Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln
        35                  40                  45

Leu Ala Phe Asp Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys
    50                  55                  60

Glu Gln Lys Tyr Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe
65                  70                  75                  80

Ser Glu Ser Ile Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys
                85                  90                  95

Ser Asn Leu Glu Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp
            100                 105                 110

Leu Glu Pro Val Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val
        115                 120                 125

Tyr Gly Ala Ser Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu
    130                 135                 140

Glu Gly Ile Gln Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg
145                 150                 155                 160
```

```
Thr Gly Gln Ile Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser
                165                 170                 175

His Asn Asp Asp Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe
            180                 185                 190

Arg Lys Asp Met Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys
        195                 200                 205

Arg Ser Val Glu Gly Ser Cys Gly Phe Ser Ser Ser Ser Lys Ala Pro
    210                 215                 220

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
225                 230                 235                 240

Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
                245                 250                 255

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
            260                 265                 270

Gln
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<210> 11
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<213> Artificial

<220>
<223> CTP-hGH-CTP-CTP

<400> 11

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Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1               5                   10                  15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Ser Ser Ser Ser Lys Ala
            20                  25                  30

Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp
        35                  40                  45

Thr Pro Ile Leu Pro Gln Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe
    50                  55                  60

Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp
65                  70                  75                  80

Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr
                85                  90                  95
```

```
Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile
            100                 105                 110

Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu
        115                 120                 125

Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val
    130                 135                 140

Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser
145                 150                 155                 160

Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln
                165                 170                 175

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

Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp
        195                 200                 205

Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met
    210                 215                 220

Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu
225                 230                 235                 240

Gly Ser Cys Gly Phe Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
                245                 250                 255

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
            260                 265                 270

Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
        275                 280                 285

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
    290                 295                 300


<210>  12
<211>  285
<212>  PRT
<213>  Artificial

<220>
<223>  Truncated-CTP-hGH-CTP-CTP

<400>  12

Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1               5                   10                  15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Ser Ser Ser Ser Lys Ala
            20                  25                  30
```

```
Pro Pro Pro Ser Leu Pro Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe
        35                  40                  45

Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp
    50                  55                  60

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

Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile
                85                  90                  95

Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu
            100                 105                 110

Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val
        115                 120                 125

Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser
    130                 135                 140

Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln
145                 150                 155                 160

Thr Leu Met Gly Arg Leu Glu Asp Gly Ser Pro Arg Thr Gly Gln Ile
                165                 170                 175

Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp
            180                 185                 190

Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met
        195                 200                 205

Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu
    210                 215                 220

Gly Ser Cys Gly Phe Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
225                 230                 235                 240

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
                245                 250                 255

Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
            260                 265                 270

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
        275                 280                 285
```

<210> 13
<211> 273

<212> PRT
<213> Artificial

<220>
<223> CTP-hGH-CTP

<400> 13

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Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1               5                  10                  15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Ser Ser Ser Ser Lys Ala
            20                  25                  30

Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp
        35                  40                  45

Thr Pro Ile Leu Pro Gln Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe
    50                  55                  60

Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp
65                  70                  75                  80

Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr
                85                  90                  95

Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile
            100                 105                 110

Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu
        115                 120                 125

Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val
    130                 135                 140

Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser
145                 150                 155                 160

Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln
                165                 170                 175

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

Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp
        195                 200                 205

Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met
    210                 215                 220

Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu
225                 230                 235                 240
```

Gly Ser Cys Gly Phe Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
245 250 255

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
260 265 270

Gln

<210> 14
<211> 245
<212> PRT
<213> Artificial

<220>
<223> GH-CTP

<400> 14

Met Ala Thr Gly Ser Arg Thr Ser Leu Leu Leu Ala Phe Gly Leu Leu
1 5 10 15

Cys Leu Pro Trp Leu Gln Glu Gly Ser Ala Ser Ser Ser Ser Lys Ala
20 25 30

Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp
35 40 45

Thr Pro Ile Leu Pro Gln Phe Pro Thr Ile Pro Leu Ser Arg Leu Phe
50 55 60

Asp Asn Ala Met Leu Arg Ala His Arg Leu His Gln Leu Ala Phe Asp
65 70 75 80

Thr Tyr Gln Glu Phe Glu Glu Ala Tyr Ile Pro Lys Glu Gln Lys Tyr
85 90 95

Ser Phe Leu Gln Asn Pro Gln Thr Ser Leu Cys Phe Ser Glu Ser Ile
100 105 110

Pro Thr Pro Ser Asn Arg Glu Glu Thr Gln Gln Lys Ser Asn Leu Glu
115 120 125

Leu Leu Arg Ile Ser Leu Leu Leu Ile Gln Ser Trp Leu Glu Pro Val
130 135 140

Gln Phe Leu Arg Ser Val Phe Ala Asn Ser Leu Val Tyr Gly Ala Ser
145 150 155 160

Asp Ser Asn Val Tyr Asp Leu Leu Lys Asp Leu Glu Glu Gly Ile Gln
165 170 175

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

Phe Lys Gln Thr Tyr Ser Lys Phe Asp Thr Asn Ser His Asn Asp Asp
195 200 205

Ala Leu Leu Lys Asn Tyr Gly Leu Leu Tyr Cys Phe Arg Lys Asp Met
210 215 220

Asp Lys Val Glu Thr Phe Leu Arg Ile Val Gln Cys Arg Ser Val Glu
225 230 235 240

Gly Ser Cys Gly Phe
245

<210> 15
<211> 853
<212> DNA
<213> Artificial

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<223> CTP-hGH-CTP

<400> 15
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cctgccatgg ctgcaggagg gcagcgccag ctcttcttct aaggctccac ccccatctct 120

gcccagcccc agcagactgc cgggccccag cgacacaccc attctgcccc agttccccac 180

catccccctg agcaggctgt tcgacaacgc catgctgagg gctcacaggc tgcaccagct 240

ggcctttgac acctaccagg agttcgagga agcctacatc cccaaggagc agaagtacag 300

cttcctgcag aacccccaga cctccctgtg cttcagcgag agcatcccca cccccagcaa 360

cagagaggag acccagcaga agagcaacct ggagctgctg aggatctccc tgctgctgat 420

ccagagctgg ctggagcccg tgcagttcct gagaagcgtg ttcgccaaca gcctggtgta 480

cggcgccagc gacagcaacg tgtacgacct gctgaaggac ctggaggagg gcatccagac 540

cctgatgggc cggctggagg acggcagccc caggaccggc cagatcttca agcagaccta 600

cagcaagttc gacaccaaca gccacaacga cgacgccctg ctgaagaact acgggctgct 660

gtactgcttc agaaaggaca tggacaaggt ggagaccttc ctgaggatcg tgcagtgcag 720

aagcgtggag ggcagctgcg gcttcagctc cagcagcaag gcccctcccc cgagcctgcc 780

ctccccaagc aggctgcctg ggccctccga cacaccaatc ctgcctcagt gatgaaggtc 840

tggatgcggc cgc 853

<210> 16
<211> 937
<212> DNA
<213> Artificial

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<223> CTP-hGH-CTP-CTP

<400> 16
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cctgccatgg ctgcaggagg gcagcgccag ctcttcttct aaggctccac ccccatctct 120

gcccagcccc agcagactgc cgggccccag cgacacaccc attctgcccc agttccccac 180

catccccctg agcaggctgt tcgacaacgc catgctgagg gctcacaggc tgcaccagct 240

ggcctttgac acctaccagg agttcgagga agcctacatc cccaaggagc agaagtacag 300

cttcctgcag aacccccaga cctccctgtg cttcagcgag agcatcccca cccccagcaa 360

cagagaggag acccagcaga agagcaacct ggagctgctg aggatctccc tgctgctgat 420

ccagagctgg ctggagcccg tgcagttcct gagaagcgtg ttcgccaaca gcctggtgta 480

cggcgccagc gacagcaacg tgtacgacct gctgaaggac ctggaggagg gcatccagac 540

cctgatgggc cggctggagg acggcagccc caggaccggc cagatcttca agcagaccta 600

cagcaagttc gacaccaaca gccacaacga cgacgccctg ctgaagaact acgggctgct 660

gtactgcttc agaaaggaca tggacaaggt ggagaccttc ctgaggatcg tgcagtgcag 720

aagcgtggag ggcagctgcg gcttcagctc cagcagcaag gcccctcccc cgagcctgcc 780

ctccccaagc aggctgcctg ggccctccga cacaccaatc ctgccacaga gcagctcctc 840

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tatcctgcct cagtgatgaa ggtctggatg cggccgc 937

<210> 17
<211> 889
<212> DNA
<213> Artificial

<220>
<223> CTP-hGH-CTP-CTP

<400> 17
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cctgccatgg ctgcaggagg gcagcgccag ctcttcttct aaggctccac ccccgagcct 120

gcccttcccc accatccccc tgagcaggct gttcgacaac gccatgctga gggctcacag 180

gctgcaccag ctggcctttg acacctacca ggagttcgag gaagcctaca tccccaagga 240

gcagaagtac agcttcctgc agaaccccca gacctccctg tgcttcagcg agagcatccc 300

caccccagc aacagagagg agacccagca gaagagcaac ctggagctgc tgaggatctc 360

cctgctgctg atccagagct ggctggagcc cgtgcagttc ctgagaagcg tgttcgccaa 420

cagcctggtg tacggcgcca gcgacagcaa cgtgtacgac ctgctgaagg acctggagga 480

gggcatccag accctgatgg gccggctgga ggacggcagc cccaggaccg gccagatctt 540

caagcagacc tacagcaagt tcgacaccaa cagccacaac gacgacgccc tgctgaagaa 600

ctacgggctg ctgtactgct tcagaaagga catggacaag gtggagacct tcctgaggat 660

cgtgcagtgc agaagcgtgg agggcagctg cggcttcagc tccagcagca aggcccctcc 720

cccgagcctg ccctccccaa gcaggctgcc tgggccctcc gacacaccaa tcctgccaca 780

gagcagctcc tctaaggccc ctcctccatc cctgccatcc ccctcccggc tgcctggccc 840

ctctgacacc cctatcctgc ctcagtgatg aaggtctgga tgcggccgc 889

<210> 18
<211> 37
<212> PRT
<213> Artificial

<220>
<223> Oxyntomodulin

<400> 18

His Ser Gln Gly Thr Phe Thr Ser Asp Tyr Ser Lys Tyr Leu Asp Ser
1 5 10 15

Arg Arg Ala Gln Asp Phe Val Gln Trp Leu Met Asn Thr Lys Arg Asn
20 25 30

Arg Asn Asn Ile Ala
35

<210> 19
<211> 221
<212> PRT
<213> Artificial

<220>
<223> EPO peptide

<400> 19

Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1 5 10 15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ala Pro Pro Arg Leu
20 25 30

Ile Cys Asp Ser Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu
35 40 45

Ala Glu Asn Ile Thr Thr Gly Cys Ala Glu His Cys Ser Leu Asn Glu
50 55 60

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

Met Glu Val Gly Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu
85 90 95

Leu Ser Glu Ala Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser
100 105 110

Gln Pro Trp Glu Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly
115 120 125

Leu Arg Ser Leu Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu
130 135 140

Ala Ile Ser Pro Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile
145 150 155 160

Thr Ala Asp Thr Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu
165 170 175

Arg Gly Lys Leu Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp
180 185 190

Arg Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
195 200 205

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
210 215 220

<210> 20
<211> 249
<212> PRT
<213> Artificial

<220>
<223> EPO-CTP-CTP

<400> 20

Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1 5 10 15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ala Pro Pro Arg Leu
20 25 30

Ile Cys Asp Ser Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu
35 40 45

Ala Glu Asn Ile Thr Thr Gly Cys Ala Glu His Cys Ser Leu Asn Glu
50 55 60

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

Met Glu Val Gly Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu
85 90 95

Leu Ser Glu Ala Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser
100 105 110

Gln Pro Trp Glu Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly
115 120 125

Leu Arg Ser Leu Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu
130 135 140

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Ala Ile Ser Pro Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile
145                 150                 155                 160

Thr Ala Asp Thr Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu
                165                 170                 175

Arg Gly Lys Leu Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp
            180                 185                 190

Arg Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
        195                 200                 205

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser
    210                 215                 220

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
225                 230                 235                 240

Pro Ser Asp Thr Pro Ile Leu Pro Gln
                245
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<210> 21
<211> 277
<212> PRT
<213> Artificial

<220>
<223> CTP-EPO-CTP-CTP

<400> 21

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Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1               5                   10                  15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ser Ser Ser Ser Lys
            20                  25                  30

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
        35                  40                  45

Asp Thr Pro Ile Leu Pro Gln Ala Pro Pro Arg Leu Ile Cys Asp Ser
    50                  55                  60

Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu Ala Glu Asn Ile
65                  70                  75                  80

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

Pro Asp Thr Lys Val Asn Phe Tyr Ala Trp Lys Arg Met Glu Val Gly
            100                 105                 110
```

```
Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu Leu Ser Glu Ala
        115                 120                 125

Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser Gln Pro Trp Glu
    130                 135                 140

Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly Leu Arg Ser Leu
145                 150                 155                 160

Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu Ala Ile Ser Pro
                165                 170                 175

Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile Thr Ala Asp Thr
            180                 185                 190

Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu Arg Gly Lys Leu
        195                 200                 205

Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp Arg Ser Ser Ser
    210                 215                 220

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
225                 230                 235                 240

Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro
                245                 250                 255

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
            260                 265                 270

Pro Ile Leu Pro Gln
        275


<210>  22
<211>  387
<212>  PRT
<213>  Artificial

<220>
<223>  EPO-CTP

<400>  22

Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1               5                   10                  15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ala Pro Pro Arg Leu
            20                  25                  30

Ile Cys Asp Ser Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu
        35                  40                  45

Ala Glu Asn Ile Thr Thr Gly Cys Ala Glu His Cys Ser Leu Asn Glu
    50                  55                  60
```

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

Met Glu Val Gly Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu
                85                  90                  95

Leu Ser Glu Ala Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser
            100                 105                 110

Gln Pro Trp Glu Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly
        115                 120                 125

Leu Arg Ser Leu Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu
    130                 135                 140

Ala Ile Ser Pro Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile
145                 150                 155                 160

Thr Ala Asp Thr Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu
                165                 170                 175

Arg Gly Lys Leu Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp
            180                 185                 190

Arg Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
        195                 200                 205

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln Ala Pro Pro
    210                 215                 220

Arg Leu Ile Cys Asp Ser Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala
225                 230                 235                 240

Lys Glu Ala Glu Asn Ile Thr Thr Gly Cys Ala Glu His Cys Ser Leu
                245                 250                 255

Asn Glu Asn Ile Thr Val Pro Asp Thr Lys Val Asn Phe Tyr Ala Trp
            260                 265                 270

Lys Arg Met Glu Val Gly Gln Gln Ala Val Glu Val Trp Gln Gly Leu
        275                 280                 285

Ala Leu Leu Ser Glu Ala Val Leu Arg Gly Gln Ala Leu Leu Val Asn
    290                 295                 300

Ser Ser Gln Pro Trp Glu Pro Leu Gln Leu His Val Asp Lys Ala Val
305                 310                 315                 320

Ser Gly Leu Arg Ser Leu Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln
                325                 330                 335
```

Lys Glu Ala Ile Ser Pro Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg
340 345 350

Thr Ile Thr Ala Asp Thr Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn
355 360 365

Phe Leu Arg Gly Lys Leu Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr
370 375 380

Gly Asp Arg
385

<210> 23
<211> 221
<212> PRT
<213> Artificial

<220>
<223> CTP-EPO

<400> 23

Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1 5 10 15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ser Ser Ser Ser Lys
20 25 30

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
35 40 45

Asp Thr Pro Ile Leu Pro Gln Ala Pro Pro Arg Leu Ile Cys Asp Ser
50 55 60

Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu Ala Glu Asn Ile
65 70 75 80

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

Pro Asp Thr Lys Val Asn Phe Tyr Ala Trp Lys Arg Met Glu Val Gly
100 105 110

Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu Leu Ser Glu Ala
115 120 125

Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser Gln Pro Trp Glu
130 135 140

Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly Leu Arg Ser Leu
145 150 155 160

```
Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu Ala Ile Ser Pro
                165                 170                 175

Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile Thr Ala Asp Thr
            180                 185                 190

Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu Arg Gly Lys Leu
        195                 200                 205

Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp Arg
    210                 215                 220
```

<210> 24
<211> 249
<212> PRT
<213> Artificial

<220>
<223> CTP-EPO-CTP

<400> 24

```
Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1               5                   10                  15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ser Ser Ser Ser Lys
            20                  25                  30

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
        35                  40                  45

Asp Thr Pro Ile Leu Pro Gln Ala Pro Pro Arg Leu Ile Cys Asp Ser
    50                  55                  60

Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu Ala Glu Asn Ile
65                  70                  75                  80

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

Pro Asp Thr Lys Val Asn Phe Tyr Ala Trp Lys Arg Met Glu Val Gly
            100                 105                 110

Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu Leu Ser Glu Ala
        115                 120                 125

Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser Gln Pro Trp Glu
    130                 135                 140

Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly Leu Arg Ser Leu
145                 150                 155                 160

Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu Ala Ile Ser Pro
                165                 170                 175
```

```
Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile Thr Ala Asp Thr
            180                 185                 190

Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu Arg Gly Lys Leu
        195                 200                 205

Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp Arg Ser Ser Ser
    210                 215                 220

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
225                 230                 235                 240

Pro Ser Asp Thr Pro Ile Leu Pro Gln
                245
```

<210> 25
<211> 193
<212> PRT
<213> Artificial

<220>
<223> EPO

<400> 25

```
Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1               5                   10                  15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ala Pro Pro Arg Leu
            20                  25                  30

Ile Cys Asp Ser Arg Val Leu Glu Arg Tyr Leu Leu Glu Ala Lys Glu
        35                  40                  45

Ala Glu Asn Ile Thr Thr Gly Cys Ala Glu His Cys Ser Leu Asn Glu
    50                  55                  60

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

Met Glu Val Gly Gln Gln Ala Val Glu Val Trp Gln Gly Leu Ala Leu
                85                  90                  95

Leu Ser Glu Ala Val Leu Arg Gly Gln Ala Leu Leu Val Asn Ser Ser
            100                 105                 110

Gln Pro Trp Glu Pro Leu Gln Leu His Val Asp Lys Ala Val Ser Gly
        115                 120                 125

Leu Arg Ser Leu Thr Thr Leu Leu Arg Ala Leu Gly Ala Gln Lys Glu
    130                 135                 140
```

Ala Ile Ser Pro Pro Asp Ala Ala Ser Ala Ala Pro Leu Arg Thr Ile
145 150 155 160

Thr Ala Asp Thr Phe Arg Lys Leu Phe Arg Val Tyr Ser Asn Phe Leu
165 170 175

Arg Gly Lys Leu Lys Leu Tyr Thr Gly Glu Ala Cys Arg Thr Gly Asp
180 185 190

Arg

<210> 26
<211> 873
<212> DNA
<213> Artificial

<220>
<223> EPO-CTP-CTP

<400> 26
tctagaggtc atcatggggg tgcacgaatg tcctgcctgg ctgtggcttc tcctgtccct 60

tctgtcgctc cctctgggcc tcccagtcct gggctcctct tcctcaaagg cccctccccc 120

gagccttcca agtccatccc gactcccggg gccctcggac accccaatat taccacaagc 180

cccaccacgc ctcatctgtg acagccgagt cctggagagg tacctcttgg aggccaagga 240

ggccgagaat atcacgacgg gctgtgctga acactgcagc ttgaatgaga atatcactgt 300

cccagacacc aaagttaatt tctatgcctg gaagaggatg gaggtcgggc agcaggccgt 360

agaagtctgg cagggcctgg ccctgctgtc ggaagctgtc ctgcggggcc aggccctgtt 420

ggtcaactct tcccagccgt gggagcccct gcagctgcat gtggataaag ccgtcagtgg 480

ccttcgcagc ctcaccactc tgcttcgggc tctgggagcc cagaaggaag ccatctcccc 540

tccagatgcg gcctcagctg ctccactccg aacaatcact gctgacactt tccgcaaact 600

cttccgagtc tactccaatt tcctccgggg aaagctgaag ctgtacacag gggaggcctg 660

caggacaggg gacagatcct cttcctcaaa ggcccctccc ccgagccttc caagtccatc 720

ccgactcccg gggccctccg acacaccaat cctgccacag agcagctcct ctaaggcccc 780

tcctccatcc ctgccatccc cctcccggct gcctggcccc tctgacaccc ctatcctgcc 840

tcagtgatga aggtcttctg gatccgcggc cgc 873

<210> 27
<211> 187
<212> PRT
<213> Homo sapiens

<400> 27

Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1 5 10 15

Thr Thr Ala Leu Ser Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg

20 25 30

Ser Ser Asn Phe Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg
35 40 45

Leu Glu Tyr Cys Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu
50 55 60

Ile Lys Gln Leu Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile
65 70 75 80

Tyr Glu Met Leu Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser
85 90 95

Ser Thr Gly Trp Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val
100 105 110

Tyr His Gln Ile Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu
115 120 125

Lys Glu Asp Phe Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys
130 135 140

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

His Cys Ala Trp Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr
165 170 175

Phe Ile Asn Arg Leu Thr Gly Tyr Leu Arg Asn
180 185

<210> 28
<211> 589
<212> DNA
<213> Homo sapiens

<400> 28
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcatgagct acaacctgct gggcttcctg cagaggtcca gcaacttcca 120

gtgccagaag ctgctgtggc agctgaacgg caggctggaa tactgcctga aggacaggat 180

gaacttcgac atcccagagg aaatcaagca gctgcagcag ttccagaagg aggacgccgc 240

cctgaccatc tacgagatgc tgcagaacat cttcgccatc ttcaggcagg acagcagcag 300

caccggctgg aacgagacca tcgtggagaa cctgctggcc aacgtgtacc accagatcaa 360

ccacctgaaa accgtgctgg aagagaagct ggaaaaggag gacttcacca ggggcaagct 420

gatgagcagc ctgcacctga agaggtacta cggcagaatc ctgcactacc tgaaggccaa 480

ggagtacagc cactgcgcct ggaccatcgt gagggtggag atcctgagga acttctactt 540

catcaacagg ctgaccggct acctgaggaa ctgatgagtc cgcggccgc 589

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

<220>
<223> Interferon

<400> 29

Thr Phe Leu Gln Pro Phe Glu Ala Phe Ala Leu Ala Gln Gln Val Val
1 5 10 15

Gly Asp Thr Val Arg Val Val Asn Met Thr Asn Lys Cys Leu Leu Gln
20 25 30

Ile Ala Leu Leu Leu Cys Phe Ser Thr Thr Ala Leu Ser Met Ser Tyr
35 40 45

Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser Asn Phe Gln Cys Gln Lys
50 55 60

Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu Tyr Cys Leu Lys Asp Arg
65 70 75 80

Met Asn Phe Asp Ile Pro Glu Glu Ile Lys Gln Leu Gln Gln Phe Gln
85 90 95

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

Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr Gly Trp Asn Glu Thr Ile
115 120 125

Val Glu Asn Leu Leu Ala Asn Val Tyr His Gln Ile Asn His Leu Lys
130 135 140

Thr Val Leu Glu Glu Lys Leu Glu Lys Glu Asp Phe Thr Arg Gly Lys
145 150 155 160

Leu Met Ser Ser Leu His Leu Lys Arg Tyr Tyr Gly Arg Ile Leu His
165 170 175

Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys Ala Trp Thr Ile Val Arg
180 185 190

Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile Asn Arg Leu Thr Gly Tyr
195 200 205

Leu Arg Asn
210

<210> 30
<211> 639
<212> DNA
<213> Artificial

<220>
<223> Interferon

<400> 30
acattctaac tgcaaccttt cgaagccttt gctctggcac aacaggtagt aggcgacact 60

gttcgtgttg tcaacatgac caacaagtgt ctcctccaaa ttgctctcct gttgtgcttc 120

tccactacag ctctttccat gagctacaac ttgcttggat tcctacaaag aagcagcaat 180

tttcagtgtc agaagctcct gtggcaattg aatgggaggc ttgaatactg cctcaaggac 240

aggatgaact ttgacatccc tgaggagatt aagcagctgc agcagttcca gaaggaggac 300

gccgcattga ccatctatga gatgctccag aacatctttg ctattttcag acaagattca 360

tctagcactg gctggaatga gactattgtt gagaacctcc tggctaatgt ctatcatcag 420

ataaaccatc tgaagacagt cctggaagaa aaactggaga aagaagattt caccagggga 480

aaactcatga gcagtctgca cctgaaaaga tattatggga ggattctgca ttacctgaag 540

gccaaggagt acagtcactg tgcctggacc atagtcagag tggaaatcct aaggaacttt 600

tacttcatta acagacttac aggttacctc cgaaactga 639

<210> 31
<211> 215
<212> PRT
<213> Artificial

<220>
<223> IFN-CTP

<400> 31

Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1 5 10 15

Thr Thr Ala Leu Ser Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg
20 25 30

Ser Ser Asn Phe Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg
35 40 45

Leu Glu Tyr Cys Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu
50 55 60

Ile Lys Gln Leu Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile
65 70 75 80

Tyr Glu Met Leu Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser
85 90 95

Ser Thr Gly Trp Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val
100 105 110

Tyr His Gln Ile Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu
115 120 125

Lys Glu Asp Phe Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys
130 135 140

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

His Cys Ala Trp Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr
165 170 175

Phe Ile Asn Arg Leu Thr Gly Tyr Leu Arg Asn Ser Ser Ser Ser Lys
180 185 190

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
195 200 205

Asp Thr Pro Ile Leu Pro Gln
210 215

<210> 32
<211> 661
<212> DNA
<213> Artificial

<220>
<223> IFN-CTP

<400> 32
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcatgagct acaacctgct gggcttcctg cagaggtcca gcaacttcca 120

gtgccagaag ctgctgtggc agctgaacgg caggctggaa tactgcctga aggacaggat 180

gaacttcgac atcccagagg aaatcaagca gctgcagcag ttccagaagg aggacgccgc 240

cctgaccatc tacgagatgc tgcagaacat cttcgccatc ttcaggcagg acagcagcag 300

caccggctgg aacgagacca tcgtggagaa cctgctggcc aacgtgtacc accagatcaa 360

ccacctgaaa accgtgctgg aagagaagct ggaaaaggag gacttcacca ggggcaagct 420

gatgagcagc ctgcacctga agaggtacta cggcagaatc ctgcactacc tgaaggccaa 480

ggagtacagc cactgcgcct ggaccatcgt gagggtggag atcctgagga acttctactt 540

catcaacagg ctgaccggct acctgaggaa cagctccagc agcaaggccc ctccaccttc 600

cctgcccagt ccaagccgac tccctgggcc ctccgataca ccaattctgc cacagtgatg 660

a 661

<210> 33
<211> 243
<212> PRT
<213> Artificial

<220>
<223> IFN-CTP-CTP

<400> 33

```
Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1               5                  10                  15

Thr Thr Ala Leu Ser Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg
            20                  25                  30

Ser Ser Asn Phe Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg
        35                  40                  45

Leu Glu Tyr Cys Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu
    50                  55                  60

Ile Lys Gln Leu Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile
65                  70                  75                  80

Tyr Glu Met Leu Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser
                85                  90                  95

Ser Thr Gly Trp Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val
            100                 105                 110

Tyr His Gln Ile Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu
        115                 120                 125

Lys Glu Asp Phe Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys
    130                 135                 140

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

His Cys Ala Trp Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr
                165                 170                 175

Phe Ile Asn Arg Leu Thr Gly Tyr Leu Arg Asn Ser Ser Ser Ser Lys
            180                 185                 190

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
        195                 200                 205

Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro
    210                 215                 220

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
225                 230                 235                 240

Leu Pro Gln
```

<210> 34
<211> 765
<212> DNA
<213> Artificial

<220>
<223> IFN-CTP-CTP

<400> 34
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcatgagct acaacctgct gggcttcctg cagaggtcca gcaacttcca 120

gtgccagaag ctgctgtggc agctgaacgg caggctggaa tactgcctga aggacaggat 180

gaacttcgac atcccagagg aaatcaagca gctgcagcag ttccagaagg aggacgccgc 240

cctgaccatc tacgagatgc tgcagaacat cttcgccatc ttcaggcagg acagcagcag 300

caccggctgg aacgagacca tcgtggagaa cctgctggcc aacgtgtacc accagatcaa 360

ccacctgaaa accgtgctgg aagagaagct ggaaaaggag gacttcacca ggggcaagct 420

gatgagcagc ctgcacctga agaggtacta cggcagaatc ctgcactacc tgaaggccaa 480

ggagtacagc cactgcgcct ggaccatcgt gagggtggag atcctgagga acttctactt 540

catcaacagg ctgaccggct acctgaggaa cagctccagc agcaaggccc ctccaccttc 600

cctgcccagt ccaagccgac tccctgggcc ctccgacaca ccaatcctgc cacagagcag 660

ctcctctaag gcccctcctc catccctgcc atccccctcc cggctgcctg gcccctctga 720

cacccctatc ctgcctcagt gatgaaggtc tggatccgcg gccgc 765

<210> 35
<211> 271
<212> PRT
<213> CTP-IFN-CTP-CTP

<400> 35

Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1 5 10 15

Thr Thr Ala Leu Ser Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
20 25 30

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
35 40 45

Gln Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser Asn Phe
50 55 60

Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu Tyr Cys
65 70 75 80

Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu Ile Lys Gln Leu
85 90 95

```
Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile Tyr Glu Met Leu
            100                 105                 110

Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr Gly Trp
        115                 120                 125

Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val Tyr His Gln Ile
    130                 135                 140

Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu Lys Glu Asp Phe
145                 150                 155                 160

Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys Arg Tyr Tyr Gly
                165                 170                 175

Arg Ile Leu His Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys Ala Trp
            180                 185                 190

Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile Asn Arg
        195                 200                 205

Leu Thr Gly Tyr Leu Arg Asn Ser Ser Ser Ser Lys Ala Pro Pro Pro
    210                 215                 220

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
225                 230                 235                 240

Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser
                245                 250                 255

Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
            260                 265                 270
```

<210> 36
<211> 849
<212> DNA
<213> Artificial

<220>
<223> CTP-IFN-CTP-CTP

<400> 36
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcagcagca gctccaaggc cccacccccc agcctgccca gccccagcag 120

actgccaggc cccagcgaca cccccatcct gccccagatg agctacaacc tgctgggctt 180

cctgcagagg tccagcaact tccagtgcca gaagctgctg tggcagctga acggcaggct 240

ggaatactgc ctgaaggaca ggatgaactt cgacatccca gaggaaatca agcagctgca 300

gcagttccag aaggaggacg ccgccctgac catctacgag atgctgcaga acatcttcgc 360

catcttcagg caggacagca gcagcaccgg ctggaacgag accatcgtgg agaacctgct 420

ggccaacgtg taccaccaga tcaaccacct gaaaaccgtg ctggaagaga agctggaaaa 480

ggaggacttc accaggggca agctgatgag cagcctgcac ctgaagaggt actacggcag 540

aatcctgcac tacctgaagg ccaaggagta cagccactgc gcctggacca tcgtgagggt 600

ggagatcctg aggaacttct acttcatcaa caggctgacc ggctacctga ggaacagctc 660

cagcagcaag gcccctccac cttccctgcc cagtccaagc cgactccctg ggccctccga 720

cacaccaatc ctgccacaga gcagctcctc taaggcccct cctccatccc tgccatcccc 780

ctcccggctg cctggcccct ctgacacccc tatcctgcct cagtgatgaa ggtctggatc 840

cgcggccgc 849

<210> 37
<211> 409
<212> PRT
<213> Artificial

<220>
<223> CTP-IFN(CTP)

<400> 37

Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1 5 10 15

Thr Thr Ala Leu Ser Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
20 25 30

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
35 40 45

Gln Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser Asn Phe
50 55 60

Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu Tyr Cys
65 70 75 80

Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu Ile Lys Gln Leu
85 90 95

Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile Tyr Glu Met Leu
100 105 110

Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr Gly Trp
115 120 125

Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val Tyr His Gln Ile
130 135 140

Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu Lys Glu Asp Phe
145 150 155 160

Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys Arg Tyr Tyr Gly

165 170 175

Arg Ile Leu His Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys Ala Trp
180 185 190

Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile Asn Arg
195 200 205

Leu Thr Gly Tyr Leu Arg Asn Ser Ser Ser Ser Lys Ala Pro Pro Pro
210 215 220

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
225 230 235 240

Leu Pro Gln Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser
245 250 255

Asn Phe Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu
260 265 270

Tyr Cys Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu Ile Lys
275 280 285

Gln Leu Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile Tyr Glu
290 295 300

Met Leu Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr
305 310 315 320

Gly Trp Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val Tyr His
325 330 335

Gln Ile Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu Lys Glu
340 345 350

Asp Phe Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys Arg Tyr
355 360 365

Tyr Gly Arg Ile Leu His Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys
370 375 380

Ala Trp Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile
385 390 395 400

Asn Arg Leu Thr Gly Tyr Leu Arg Asn
405

<210> 38
<211> 1261
<212> DNA
<213> Artificial

<220>
<223> CTP-IFN(CTP)

<400> 38
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcagcagca gctccaaggc cccacccccc agcctgccca gccccagcag 120

gctgccaggc cccagcgaca cccccatcct gccccagatg agctacaacc tgctgggctt 180

cctgcagagg tccagcaact tccagtgcca gaaactgctg tggcagctga acggcaggct 240

ggaatactgc ctgaaggacc ggatgaactt cgacatcccc gaagagatca agcagctgca 300

gcagttccag aaagaggacg ccgccctgac catctacgag atgctgcaga acatcttcgc 360

catcttcagg caggacagca gcagcaccgg ctggaacgag accatcgtgg agaacctgct 420

ggccaacgtg taccaccaga tcaaccacct gaaaaccgtg ctggaagaga agctggaaaa 480

agaggacttc accaggggca agctgatgag cagcctgcac ctgaagaggt actacggcag 540

aatcctgcac tacctgaagg ccaaagagta cagccactgc gcctggacca tcgtgagggt 600

ggagatcctg cggaacttct acttcatcaa caggctgacc ggctacctga ggaacagctc 660

cagcagcaag gcccctccac cctccctgcc ctccccaagc agactgcccg gaccctccga 720

cacaccaatt ctgccacaga tgtcctacaa tctgctcgga tttctgcagc gctcctccaa 780

ctttcagtgt cagaagctcc tctggcagct caatggccgc ctggaatatt gtctgaaaga 840

cagaatgaat tttgacatcc cagaggaaat taaacagctc cagcagtttc agaaagaaga 900

tgctgctctc acaatctatg aaatgctcca gaatatcttt gcaatctttc gccaggacag 960

ctcctccacc gggtggaatg agacaattgt cgagaatctg ctcgccaatg tctatcatca 1020

gatcaatcac ctcaagacag tcctcgaaga aaaactcgaa aaagaagatt tcacacgcgg 1080

caaactgatg tcctccctgc atctgaagcg ctactatggg cgcatcctgc attatctgaa 1140

agctaaagaa tactcccact gtgcttggac aattgtgcgc gtcgagatcc tgagaaactt 1200

ttatttcatt aaccgcctga caggatacct gcgcaactga tgaaggtctg gatgcggccg 1260

c 1261

<210> 39
<211> 215
<212> PRT
<213> Artificial

<220>
<223> CTP-IFN

<400> 39

Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1 5 10 15

Thr Thr Ala Leu Ser Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
20 25 30

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro

35 40 45

Gln Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser Asn Phe
50 55 60

Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu Tyr Cys
65 70 75 80

Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu Ile Lys Gln Leu
85 90 95

Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile Tyr Glu Met Leu
100 105 110

Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr Gly Trp
115 120 125

Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val Tyr His Gln Ile
130 135 140

Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu Lys Glu Asp Phe
145 150 155 160

Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys Arg Tyr Tyr Gly
165 170 175

Arg Ile Leu His Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys Ala Trp
180 185 190

Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile Asn Arg
195 200 205

Leu Thr Gly Tyr Leu Arg Asn
210 215

<210> 40
<211> 673
<212> DNA
<213> Artificial

<220>
<223> CTP-IFN

<400> 40
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcagcagca gctccaaggc cccacccccc agcctgccca gccccagcag 120

gctgccaggc cccagcgaca cccccatcct gccccagatg agctacaacc tgctgggctt 180

cctgcagagg tccagcaact tccagtgcca gaaactgctg tggcagctga acggcaggct 240

ggaatactgc ctgaaggacc ggatgaactt cgacatcccc gaagagatca agcagctgca 300

gcagttccag aaagaggacg ccgccctgac catctacgag atgctgcaga acatcttcgc 360

catcttcagg caggacagca gcagcaccgg ctggaacgag accatcgtgg agaacctgct 420

ggccaacgtg taccaccaga tcaaccacct gaaaaccgtg ctggaagaga agctggaaaa 480

agaggacttc accaggggca agctgatgag cagcctgcac ctgaagaggt actacggcag 540

aatcctgcac tacctgaagg ccaaagagta cagccactgc gcctggacca tcgtgagggt 600

ggagatcctg cggaacttct acttcatcaa caggctgacc ggctacctga ggaactgatg 660

agtccgcggc cgc 673

<210> 41
<211> 243
<212> PRT
<213> Artificial

<220>
<223> CTP-IFN-CTP

<400> 41

Met Thr Asn Lys Cys Leu Leu Gln Ile Ala Leu Leu Leu Cys Phe Ser
1 5 10 15

Thr Thr Ala Leu Ser Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
20 25 30

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
35 40 45

Gln Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser Asn Phe
50 55 60

Gln Cys Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu Tyr Cys
65 70 75 80

Leu Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu Ile Lys Gln Leu
85 90 95

Gln Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile Tyr Glu Met Leu
100 105 110

Gln Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr Gly Trp
115 120 125

Asn Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val Tyr His Gln Ile
130 135 140

Asn His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu Lys Glu Asp Phe
145 150 155 160

Thr Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys Arg Tyr Tyr Gly
165 170 175

Arg Ile Leu His Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys Ala Trp

180 185 190

Thr Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile Asn Arg
195 200 205

Leu Thr Gly Tyr Leu Arg Asn Ser Ser Ser Ser Lys Ala Pro Pro Pro
210 215 220

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
225 230 235 240

Leu Pro Gln

<210> 42
<211> 763
<212> DNA
<213> Artificial

<220>
<223> CTP-IFN-CTP

<400> 42
tctagaggac atgaccaaca agtgcctgct gcagatcgcc ctgctgctgt gcttcagcac 60

caccgccctg agcagcagca gctccaaggc cccacccccc agcctgccca gccccagcag 120

actgccaggc cccagcgaca cccccatcct gccccagatg agctacaacc tgctgggctt 180

cctgcagagg tccagcaact tccagtgcca gaagctgctg tggcagctga acggcaggct 240

ggaatactgc ctgaaggaca ggatgaactt cgacatccca gaggaaatca agcagctgca 300

gcagttccag aaggaggacg ccgccctgac catctacgag atgctgcaga acatcttcgc 360

catcttcagg caggacagca gcagcaccgg ctggaacgag accatcgtgg agaacctgct 420

ggccaacgtg taccaccaga tcaaccacct gaaaaccgtg ctggaagaga agctggaaaa 480

ggaggacttc accaggggca agctgatgag cagcctgcac ctgaagaggt actacggcag 540

aatcctgcac tacctgaagg ccaaggagta cagccactgc gcctggacca tcgtgagggt 600

ggagatcctg aggaacttct acttcatcaa caggctgacc ggctacctga ggaacagctc 660

cagcagcaag gcccctccac cttccctgcc cagtccaagc cgactccctg ggccctccga 720

tacaccaatt ctgccacagt gatgaaggtc tggatgcggc cgc 763

<210> 43
<211> 166
<212> PRT
<213> Artificial

<220>
<223> IFN-beta

<400> 43

Met Ser Tyr Asn Leu Leu Gly Phe Leu Gln Arg Ser Ser Asn Phe Gln
1 5 10 15

```
Ser Gln Lys Leu Leu Trp Gln Leu Asn Gly Arg Leu Glu Tyr Cys Leu
            20                  25                  30

Lys Asp Arg Met Asn Phe Asp Ile Pro Glu Glu Ile Lys Gln Leu Gln
        35                  40                  45

Gln Phe Gln Lys Glu Asp Ala Ala Leu Thr Ile Tyr Glu Met Leu Gln
    50                  55                  60

Asn Ile Phe Ala Ile Phe Arg Gln Asp Ser Ser Ser Thr Gly Trp Asn
65                  70                  75                  80

Glu Thr Ile Val Glu Asn Leu Leu Ala Asn Val Tyr His Gln Ile Asn
                85                  90                  95

His Leu Lys Thr Val Leu Glu Glu Lys Leu Glu Lys Glu Asp Phe Thr
            100                 105                 110

Arg Gly Lys Leu Met Ser Ser Leu His Leu Lys Arg Tyr Tyr Gly Arg
        115                 120                 125

Ile Leu His Tyr Leu Lys Ala Lys Glu Tyr Ser His Cys Ala Trp Thr
    130                 135                 140

Ile Val Arg Val Glu Ile Leu Arg Asn Phe Tyr Phe Ile Asn Arg Leu
145                 150                 155                 160

Thr Gly Tyr Leu Arg Asn
                165
```

<210> 44
<211> 242
<212> PRT
<213> Artificial

<220>
<223> APO-A1

<400> 44

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Asp Glu Pro Pro Gln Ser Pro Trp Asp Arg Val Lys Asp Lys Ala Thr
1               5                   10                  15

Val Tyr Val Asp Val Leu Lys Asp Ser Gly Arg Asp Tyr Val Ser Gln
            20                  25                  30

Phe Glu Gly Ser Ala Gly Lys Gly Leu Asn Leu Lys Leu Leu Asp Asn
        35                  40                  45

Trp Asp Ser Val Thr Ser Thr Phe Ser Lys Leu Arg Glu Gln Leu Gly
    50                  55                  60

Pro Val Thr Gln Glu Phe Trp Asp Asn Leu Glu Lys Glu Thr Glu Gly
```

65 70 75 80

Leu Arg Gly Glu Met Ser Lys Asp Leu Glu Glu Val Lys Ala Lys Val
85 90 95

Gln Pro Tyr Leu Asp Asp Phe Gln Lys Lys Trp Gln Glu Glu Met Glu
100 105 110

Leu Tyr Arg Gln Lys Val Glu Pro Leu Arg Ala Glu Leu Gln Glu Gly
115 120 125

Ala Arg Gln Lys Leu His Glu Leu Gln Glu Lys Leu Ser Pro Leu Gly
130 135 140

Glu Glu Met Arg Asp Arg Ala Arg Ala His Val Asp Ala Leu Arg Thr
145 150 155 160

His Leu Ala Pro Tyr Ser Asp Glu Leu Arg Gln Arg Leu Ala Ala Arg
165 170 175

Leu Glu Ala Leu Lys Glu Asn Gly Gly Ala Arg Leu Ala Glu Tyr His
180 185 190

Ala Lys Ala Thr Glu His Leu Ser Thr Leu Ser Glu Lys Ala Lys Pro
195 200 205

Ala Leu Glu Asp Leu Arg Gln Gly Leu Leu Pro Val Leu Glu Ser Phe
210 215 220

Lys Val Ser Phe Leu Ser Ala Leu Glu Glu Tyr Thr Lys Lys Leu Asn
225 230 235 240

Thr Gln

<210> 45
<211> 444
<212> PRT
<213> Homo sapiens

<400> 45

Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1 5 10 15

Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
20 25 30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
35 40 45

Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
50 55 60

```
Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240

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

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
        275                 280                 285

Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
    290                 295                 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305                 310                 315                 320

Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
                325                 330                 335
```

```
Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
            340                 345                 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
        355                 360                 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
    370                 375                 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385                 390                 395                 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
                405                 410                 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
            420                 425                 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro
        435                 440
```

<210> 46
<211> 448
<212> PRT
<213> Homo sapiens

<400> 46

```
Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1               5                   10                  15

Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
            20                  25                  30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
        35                  40                  45

Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
    50                  55                  60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125
```

```
Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240

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

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
        275                 280                 285

Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
    290                 295                 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305                 310                 315                 320

Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
                325                 330                 335

Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
            340                 345                 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
        355                 360                 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
    370                 375                 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385                 390                 395                 400
```

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
405 410 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
420 425 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro Gly Cys Gly Arg
435 440 445

<210> 47
<211> 1356
<212> DNA
<213> Homo sapiens

<400> 47
ctcgaggaca tggtctccca ggccctcagg ctcctctgcc ttctgcttgg gcttcagggc 60

tgcctggctg cagtcttcgt aacccaggag gaagcccacg gcgtcctgca ccggcgccgg 120

cgcgccaacg cgttcctgga ggagctgcgg ccgggctccc tggagaggga gtgcaaggag 180

gagcagtgct ccttcgagga ggcccgggag atcttcaagg acgcggagag gacgaagctg 240

ttctggattt cttacagtga tggggaccag tgtgcctcaa gtccatgcca gaatgggggc 300

tcctgcaagg accagctcca gtcctatatc tgcttctgcc tccctgcctt cgagggccgg 360

aactgtgaga cgcacaagga tgaccagctg atctgtgtga acgagaacgg cggctgtgag 420

cagtactgca gtgaccacac gggcaccaag cgctcctgtc ggtgccacga ggggtactct 480

ctgctggcag acggggtgtc ctgcacaccc acagttgaat atccatgtgg aaaaatacct 540

attctagaaa aaagaaatgc cagcaaaccc caaggccgaa ttgtgggggg caaggtgtgc 600

cccaaagggg agtgtccatg gcaggtcctg ttgttggtga atggagctca gttgtgtggg 660

gggaccctga tcaacaccat ctgggtggtc tccgcggccc actgtttcga caaaatcaag 720

aactggagga acctgatcgc ggtgctgggc gagcacgacc tcagcgagca cgacggggat 780

gagcagagcc ggcgggtggc gcaggtcatc atccccagca cgtacgtccc gggcaccacc 840

aaccacgaca tcgcgctgct ccgcctgcac cagcccgtgg tcctcactga ccatgtggtg 900

cccctctgcc tgcccgaacg gacgttctct gagaggacgc tggccttcgt gcgcttctca 960

ttggtcagcg gctggggcca gctgctggac cgtggcgcca cggccctgga gctcatggtc 1020

ctcaacgtgc cccggctgat gacccaggac tgcctgcagc agtcacggaa ggtgggagac 1080

tccccaaata tcacggagta catgttctgt gccggctact cggatggcag caaggactcc 1140

tgcaaggggg acagtggagg cccacatgcc acccactacc ggggcacgtg gtacctgacg 1200

ggcatcgtca gctggggcca gggctgcgca accgtgggcc actttggggt gtacaccagg 1260

gtctcccagt acatcgagtg gctgcaaaag ctcatgcgct cagagccacg cccaggagtc 1320

ctcctgcgag ccccatttcc ctgaggatgc ggccgc 1356

<210> 48
<211> 1442

<212> DNA
<213> Artificial

<220>
<223> Factor VII-CTP

<400> 48
ctcgaggaca tggtctccca ggccctcagg ctcctctgcc ttctgcttgg gcttcagggc 60

tgcctggctg cagtcttcgt aacccaggag gaagcccacg gcgtcctgca ccggcgccgg 120

cgcgccaacg cgttcctgga ggagctgcgg ccgggctccc tggagaggga gtgcaaggag 180

gagcagtgct ccttcgagga ggcccgggag atcttcaagg acgcggagag gacgaagctg 240

ttctggattt cttacagtga tggggaccag tgtgcctcaa gtccatgcca gaatgggggc 300

tcctgcaagg accagctcca gtcctatatc tgcttctgcc tccctgcctt cgagggccgg 360

aactgtgaga cgcacaagga tgaccagctg atctgtgtga acgagaacgg cggctgtgag 420

cagtactgca gtgaccacac gggcaccaag cgctcctgtc ggtgccacga ggggtactct 480

ctgctggcag acggggtgtc ctgcacaccc acagttgaat atccatgtgg aaaaatacct 540

attctagaaa aaagaaatgc cagcaaaccc caaggccgaa ttgtgggggg caaggtgtgc 600

cccaaagggg agtgtccatg gcaggtcctg ttgttggtga atggagctca gttgtgtggg 660

gggaccctga tcaacaccat ctgggtggtc tccgcggccc actgtttcga caaaatcaag 720

aactggagga acctgatcgc ggtgctgggc gagcacgacc tcagcgagca cgacggggat 780

gagcagagcc ggcgggtggc gcaggtcatc atccccagca cgtacgtccc gggcaccacc 840

aaccacgaca tcgcgctgct ccgcctgcac cagcccgtgg tcctcactga ccatgtggtg 900

cccctctgcc tgcccgaacg gacgttctct gagaggacgc tggccttcgt gcgcttctca 960

ttggtcagcg gctggggcca gctgctggac cgtggcgcca cggccctgga gctcatggtc 1020

ctcaacgtgc cccggctgat gacccaggac tgcctgcagc agtcacggaa ggtgggagac 1080

tccccaaata tcacggagta catgttctgt gccggctact cggatggcag caaggactcc 1140

tgcaaggggg acagtggagg cccacatgcc acccactacc ggggcacgtg gtacctgacc 1200

ggcatcgtga gctggggcca gggctgcgcc accgtgggcc acttcggcgt gtacaccagg 1260

gtgtcccagt acatcgagtg gctgcagaaa ctgatgagaa gcgagcccag acccggcgtg 1320

ctgctgagag ccccccttccc cagcagcagc tccaaggccc ctccccctag cctgcccagc 1380

cctagcagac tgcctgggcc cagcgacacc cccatcctgc cccagtgagg atccgcggcc 1440

gc 1442

<210> 49
<211> 472
<212> PRT
<213> Artificial

<220>
<223> Factor VII-CTP

<400> 49

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Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1               5                  10                  15

Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
            20                  25                  30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
        35                  40                  45

Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
    50                  55                  60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240

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

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270
```

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
275 280 285

Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
290 295 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305 310 315 320

Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
325 330 335

Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
340 345 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
355 360 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
370 375 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385 390 395 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
405 410 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
420 425 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro Ser Ser Ser Ser
435 440 445

Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro
450 455 460

Ser Asp Thr Pro Ile Leu Pro Gln
465 470

<210> 50
<211> 1535
<212> DNA
<213> Artificial

<220>
<223> Factor VII-CTP-CTP

<400> 50
ctcgaggaca tggtctccca ggccctcagg ctcctctgcc ttctgcttgg gcttcagggc 60

tgcctggctg cagtcttcgt aacccaggag gaagcccacg gcgtcctgca ccggcgccgg 120

cgcgccaacg cgttcctgga ggagctgcgg ccgggctccc tggagaggga gtgcaaggag 180

gagcagtgct ccttcgagga ggcccgggag atcttcaagg acgcggagag gacgaagctg 240

ttctggattt cttacagtga tggggaccag tgtgcctcaa gtccatgcca gaatgggggc 300

tcctgcaagg accagctcca gtcctatatc tgcttctgcc tccctgcctt cgagggccgg 360

aactgtgaga cgcacaagga tgaccagctg atctgtgtga acgagaacgg cggctgtgag 420

cagtactgca gtgaccacac gggcaccaag cgctcctgtc ggtgccacga ggggtactct 480

ctgctggcag acggggtgtc ctgcacaccc acagttgaat atccatgtgg aaaaatacct 540

attctagaaa aaagaaatgc cagcaaaccc caaggccgaa ttgtgggggg caaggtgtgc 600

cccaaagggg agtgtccatg gcaggtcctg ttgttggtga atggagctca gttgtgtggg 660

gggaccctga tcaacaccat ctgggtggtc tccgcggccc actgtttcga caaaatcaag 720

aactggagga acctgatcgc ggtgctgggc gagcacgacc tcagcgagca cgacggggat 780

gagcagagcc ggcgggtggc gcaggtcatc atccccagca cgtacgtccc gggcaccacc 840

aaccacgaca tcgcgctgct ccgcctgcac cagcccgtgg tcctcactga ccatgtggtg 900

cccctctgcc tgcccgaacg gacgttctct gagaggacgc tggccttcgt gcgcttctca 960

ttggtcagcg gctggggcca gctgctggac cgtggcgcca cggccctgga gctcatggtc 1020

ctcaacgtgc cccggctgat gacccaggac tgcctgcagc agtcacggaa ggtgggagac 1080

tccccaaata tcacggagta catgttctgt gccggctact cggatggcag caaggactcc 1140

tgcaaggggg acagtggagg cccacatgcc acccactacc ggggcacgtg gtacctgacc 1200

ggcatcgtga gctggggcca gggctgcgcc accgtgggcc acttcggcgt gtacaccagg 1260

gtgtcccagt acatcgagtg gctgcagaaa ctgatgagaa gcgagcccag acccggcgtg 1320

ctgctgagag ccccccttccc cagcagcagc tccaaggccc ctccccctag cctgcccagc 1380

cctagcagac tgcctgggcc ctccgacaca ccaatcctgc cacagagcag ctcctctaag 1440

gcccctcctc catccctgcc atccccctcc cggctgccag gcccctctga cacccctatc 1500

ctgcctcagt gatgaaggtc tggatccgcg gccgc 1535

<210> 51
<211> 500
<212> PRT
<213> artificial

<220>
<223> factor VII-CTP-CTP

<400> 51

Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1 5 10 15

Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
20 25 30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
35 40 45

```
Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
    50                  55                  60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240

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

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
        275                 280                 285

Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
    290                 295                 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305                 310                 315                 320
```

Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
325 330 335

Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
340 345 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
355 360 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
370 375 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385 390 395 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
405 410 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
420 425 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro Ser Ser Ser Ser
435 440 445

Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro
450 455 460

Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro
465 470 475 480

Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro
485 490 495

Ile Leu Pro Gln
500

<210> 52
<211> 528
<212> PRT
<213> artificial

<220>
<223> factor VII-CTP-CTP-CTP

<400> 52

Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1 5 10 15

Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
20 25 30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
35 40 45

```
Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
    50                  55                  60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240

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

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
        275                 280                 285

Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
    290                 295                 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305                 310                 315                 320
```

```
Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
                325                 330                 335

Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
            340                 345                 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
        355                 360                 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
    370                 375                 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385                 390                 395                 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
                405                 410                 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
            420                 425                 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro Ser Ser Ser Ser
        435                 440                 445

Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro
    450                 455                 460

Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro
465                 470                 475                 480

Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro
                485                 490                 495

Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro
            500                 505                 510

Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
        515                 520                 525


<210>  53
<211>  556
<212>  PRT
<213>  artificial

<220>
<223>  factor VII-CTP-CTP-CTP-CTP

<400>  53

Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1               5                   10                  15
```

```
Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
            20                  25                  30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
        35                  40                  45

Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
    50                  55                  60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240

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

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
        275                 280                 285
```

```
Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
    290                 295                 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305                 310                 315                 320

Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
                325                 330                 335

Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
            340                 345                 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
        355                 360                 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
    370                 375                 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385                 390                 395                 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
                405                 410                 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
            420                 425                 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro Ser Ser Ser Ser
        435                 440                 445

Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro
    450                 455                 460

Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro
465                 470                 475                 480

Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro
                485                 490                 495

Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro
            500                 505                 510

Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
        515                 520                 525

Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg
    530                 535                 540

Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
545                 550                 555
```

<210> 54
<211> 584
<212> PRT
<213> artificial

<220>
<223> factor VII-CTP-CTP-CTP-CTP

<400> 54

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Met Val Ser Gln Ala Leu Arg Leu Leu Cys Leu Leu Leu Gly Leu Gln
1               5                   10                  15

Gly Cys Leu Ala Ala Val Phe Val Thr Gln Glu Glu Ala His Gly Val
            20                  25                  30

Leu His Arg Arg Arg Arg Ala Asn Ala Phe Leu Glu Glu Leu Arg Pro
        35                  40                  45

Gly Ser Leu Glu Arg Glu Cys Lys Glu Glu Gln Cys Ser Phe Glu Glu
    50                  55                  60

Ala Arg Glu Ile Phe Lys Asp Ala Glu Arg Thr Lys Leu Phe Trp Ile
65                  70                  75                  80

Ser Tyr Ser Asp Gly Asp Gln Cys Ala Ser Ser Pro Cys Gln Asn Gly
                85                  90                  95

Gly Ser Cys Lys Asp Gln Leu Gln Ser Tyr Ile Cys Phe Cys Leu Pro
            100                 105                 110

Ala Phe Glu Gly Arg Asn Cys Glu Thr His Lys Asp Asp Gln Leu Ile
        115                 120                 125

Cys Val Asn Glu Asn Gly Gly Cys Glu Gln Tyr Cys Ser Asp His Thr
    130                 135                 140

Gly Thr Lys Arg Ser Cys Arg Cys His Glu Gly Tyr Ser Leu Leu Ala
145                 150                 155                 160

Asp Gly Val Ser Cys Thr Pro Thr Val Glu Tyr Pro Cys Gly Lys Ile
                165                 170                 175

Pro Ile Leu Glu Lys Arg Asn Ala Ser Lys Pro Gln Gly Arg Ile Val
            180                 185                 190

Gly Gly Lys Val Cys Pro Lys Gly Glu Cys Pro Trp Gln Val Leu Leu
        195                 200                 205

Leu Val Asn Gly Ala Gln Leu Cys Gly Gly Thr Leu Ile Asn Thr Ile
    210                 215                 220

Trp Val Val Ser Ala Ala His Cys Phe Asp Lys Ile Lys Asn Trp Arg
225                 230                 235                 240
```

```
Asn Leu Ile Ala Val Leu Gly Glu His Asp Leu Ser Glu His Asp Gly
                245                 250                 255

Asp Glu Gln Ser Arg Arg Val Ala Gln Val Ile Ile Pro Ser Thr Tyr
            260                 265                 270

Val Pro Gly Thr Thr Asn His Asp Ile Ala Leu Leu Arg Leu His Gln
        275                 280                 285

Pro Val Val Leu Thr Asp His Val Val Pro Leu Cys Leu Pro Glu Arg
    290                 295                 300

Thr Phe Ser Glu Arg Thr Leu Ala Phe Val Arg Phe Ser Leu Val Ser
305                 310                 315                 320

Gly Trp Gly Gln Leu Leu Asp Arg Gly Ala Thr Ala Leu Glu Leu Met
                325                 330                 335

Val Leu Asn Val Pro Arg Leu Met Thr Gln Asp Cys Leu Gln Gln Ser
            340                 345                 350

Arg Lys Val Gly Asp Ser Pro Asn Ile Thr Glu Tyr Met Phe Cys Ala
        355                 360                 365

Gly Tyr Ser Asp Gly Ser Lys Asp Ser Cys Lys Gly Asp Ser Gly Gly
    370                 375                 380

Pro His Ala Thr His Tyr Arg Gly Thr Trp Tyr Leu Thr Gly Ile Val
385                 390                 395                 400

Ser Trp Gly Gln Gly Cys Ala Thr Val Gly His Phe Gly Val Tyr Thr
                405                 410                 415

Arg Val Ser Gln Tyr Ile Glu Trp Leu Gln Lys Leu Met Arg Ser Glu
            420                 425                 430

Pro Arg Pro Gly Val Leu Leu Arg Ala Pro Phe Pro Ser Ser Ser Ser
        435                 440                 445

Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro
    450                 455                 460

Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro
465                 470                 475                 480

Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro
                485                 490                 495

Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro
            500                 505                 510
```

Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
515 520 525

Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg
530 535 540

Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser
545 550 555 560

Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro
565 570 575

Ser Asp Thr Pro Ile Leu Pro Gln
580

<210> 55
<211> 1404
<212> DNA
<213> Homo sapiens

<400> 55
gcgatcgcca tgcagcgcgt gaacatgatc atggcagaat caccaggcct catcaccatt 60

gccttttagg atatctactc agtgctgaat gtacagtttt tcttgatcat gaaaacgcca 120

acaaaattct gaatcggcca aagaggtata attcaggtaa attggaagag tttgttcaag 180

ggaaccttga gagagaatgt atggaagaaa agtgtagttt tgaagaagca cgagaagttt 240

ttgaaaacac tgaaagaaca actgaatttt ggaagcagta tgttgatgga gatcagtgtg 300

agtccaatcc atgtttaaat ggcggcagtt gcaaggatga cattaattcc tatgaatgtt 360

ggtgtccctt tggatttgaa ggaaagaact gtgaattaga tgtaacatgt aacattaaga 420

atggcagatg cgagcagttt tgtaaaaata gtgctgataa caaggtggtt tgctcctgta 480

ctgagggata tcgacttgca gaaaaccaga agtcctgtga accagcagtg ccatttccat 540

gtggaagagt ttctgtttca caaacttcta agctcacccg tgctgagact gtttttcctg 600

atgtggacta tgtaaattct actgaagctg aaaccatttt ggataacatc actcaaagca 660

cccaatcatt taatgacttc actcgagttg ttggtggaga agatgccaaa ccaggtcaat 720

tcccttggca ggttgttttg aatggtaaag ttgatgcatt ctgtggaggc tctatcgtta 780

atgaaaaatg gattgtaact gctgcccact gtgttgaaac tggtgttaaa attacagttg 840

tcgcaggtga acataatatt gaggagacag aacatacaga gcaaaagcga aatgtgattc 900

gaattattcc tcaccacaac tacaatgcag ctattaataa gtacaaccat gacattgccc 960

ttctggaact ggacgaaccc ttagtgctaa acagctacgt tacacctatt tgcattgctg 1020

acaaggaata cacgaacatc ttcctcaaat ttggatctgg ctatgtaagt ggctggggaa 1080

gagtcttcca caaagggaga tcagctttag ttctccagta ccttagagtt ccacttgttg 1140

accgagccac atgtcttcga tctacaaagt tcaccatcta taacaacatg ttctgtgctg 1200

gcttccatga aggaggtaga gattcatgtc aaggagatag tgggggaccc catgttactg 1260

aagtggaagg gaccagtttc ttaactggaa ttattagctg gggtgaagag tgtgcaatga 1320

aaggcaaata tggaatatat accaaggtat cccggtatgt caactggatt aaggaaaaaa 1380

caaagctcac ttgaacgcgg ccgc 1404

<210> 56
<211> 461
<212> PRT
<213> Homo sapiens

<400> 56

Met Gln Arg Val Asn Met Ile Met Ala Glu Ser Pro Gly Leu Ile Thr
1 5 10 15

Ile Cys Leu Leu Gly Tyr Leu Leu Ser Ala Glu Cys Thr Val Phe Leu
20 25 30

Asp His Glu Asn Ala Asn Lys Ile Leu Asn Arg Pro Lys Arg Tyr Asn
35 40 45

Ser Gly Lys Leu Glu Glu Phe Val Gln Gly Asn Leu Glu Arg Glu Cys
50 55 60

Met Glu Glu Lys Cys Ser Phe Glu Glu Ala Arg Glu Val Phe Glu Asn
65 70 75 80

Thr Glu Arg Thr Thr Glu Phe Trp Lys Gln Tyr Val Asp Gly Asp Gln
85 90 95

Cys Glu Ser Asn Pro Cys Leu Asn Gly Gly Ser Cys Lys Asp Asp Ile
100 105 110

Asn Ser Tyr Glu Cys Trp Cys Pro Phe Gly Phe Glu Gly Lys Asn Cys
115 120 125

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

Cys Lys Asn Ser Ala Asp Asn Lys Val Val Cys Ser Cys Thr Glu Gly
145 150 155 160

Tyr Arg Leu Ala Glu Asn Gln Lys Ser Cys Glu Pro Ala Val Pro Phe
165 170 175

Pro Cys Gly Arg Val Ser Val Ser Gln Thr Ser Lys Leu Thr Arg Ala
180 185 190

Glu Thr Val Phe Pro Asp Val Asp Tyr Val Asn Ser Thr Glu Ala Glu
195 200 205

```
Thr Ile Leu Asp Asn Ile Thr Gln Ser Thr Gln Ser Phe Asn Asp Phe
    210                 215                 220

Thr Arg Val Val Gly Gly Glu Asp Ala Lys Pro Gly Gln Phe Pro Trp
225                 230                 235                 240

Gln Val Val Leu Asn Gly Lys Val Asp Ala Phe Cys Gly Gly Ser Ile
                245                 250                 255

Val Asn Glu Lys Trp Ile Val Thr Ala Ala His Cys Val Glu Thr Gly
            260                 265                 270

Val Lys Ile Thr Val Val Ala Gly Glu His Asn Ile Glu Glu Thr Glu
        275                 280                 285

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

Tyr Asn Ala Ala Ile Asn Lys Tyr Asn His Asp Ile Ala Leu Leu Glu
305                 310                 315                 320

Leu Asp Glu Pro Leu Val Leu Asn Ser Tyr Val Thr Pro Ile Cys Ile
                325                 330                 335

Ala Asp Lys Glu Tyr Thr Asn Ile Phe Leu Lys Phe Gly Ser Gly Tyr
            340                 345                 350

Val Ser Gly Trp Gly Arg Val Phe His Lys Gly Arg Ser Ala Leu Val
        355                 360                 365

Leu Gln Tyr Leu Arg Val Pro Leu Val Asp Arg Ala Thr Cys Leu Arg
    370                 375                 380

Ser Thr Lys Phe Thr Ile Tyr Asn Asn Met Phe Cys Ala Gly Phe His
385                 390                 395                 400

Glu Gly Gly Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro His Val
                405                 410                 415

Thr Glu Val Glu Gly Thr Ser Phe Leu Thr Gly Ile Ile Ser Trp Gly
            420                 425                 430

Glu Glu Cys Ala Met Lys Gly Lys Tyr Gly Ile Tyr Thr Lys Val Ser
        435                 440                 445

Arg Tyr Val Asn Trp Ile Lys Glu Lys Thr Lys Leu Thr
    450                 455                 460
```

<210> 57
<211> 1502
<212> DNA
<213> artificial

<220>
<223> factor IX-CTP

<400> 57
gcgatcgcca tgcagcgcgt gaacatgatc atggcagaat caccaggcct catcaccatc 60

tgccttttag gatatctact cagtgctgaa tgtacagttt ttcttgatca tgaaaacgcc 120

aacaaaattc tgaatcggcc aaagaggtat aattcaggta aattggaaga gtttgttcaa 180

gggaaccttg agagagaatg tatggaagaa aagtgtagtt ttgaagaagc acgagaagtt 240

tttgaaaaca ctgaaagaac aactgaattt tggaagcagt atgttgatgg agatcagtgt 300

gagtccaatc catgtttaaa tggcggcagt tgcaaggatg acattaattc ctatgaatgt 360

tggtgtccct ttggatttga aggaaagaac tgtgaattag atgtaacatg taacattaag 420

aatggcagat gcgagcagtt ttgtaaaaat agtgctgata acaaggtggt ttgctcctgt 480

actgagggat atcgacttgc agaaaaccag aagtcctgtg aaccagcagt gccatttcca 540

tgtggaagag tttctgtttc acaaacttct aagctcaccc gtgctgagac tgtttttcct 600

gatgtggact atgtaaattc tactgaagct gaaaccattt tggataacat cactcaaagc 660

acccaatcat ttaatgactt cactcgagtt gttggtggag aagatgccaa accaggtcaa 720

ttcccttggc aggttgtttt gaatggtaaa gttgatgcat tctgtggagg ctctatcgtt 780

aatgaaaaat ggattgtaac tgctgcccac tgtgttgaaa ctggtgttaa aattacagtt 840

gtcgcaggtg aacataatat tgaggagaca gaacatacag agcaaaagcg aaatgtgatt 900

cgaattattc ctcaccacaa ctacaatgca gctattaata agtacaacca tgacattgcc 960

cttctggaac tggacgaacc cttagtgcta aacagctacg ttacacctat ttgcattgct 1020

gacaaggaat acacgaacat cttcctcaaa tttggatctg gctatgtaag tggctgggga 1080

agagtcttcc acaaagggag atcagcttta gttcttcagt accttagagt tccacttgtt 1140

gaccgagcca catgtcttcg atctacaaag ttcaccatct ataacaacat gttctgtgct 1200

ggcttccatg aaggaggtag agattcatgt caaggagata gtgggggacc ccatgttact 1260

gaagtggaag ggaccagttt cttaactgga attattagct ggggtgaaga gtgtgcaatg 1320

aaaggcaaat atggaatata taccaaggta tcccggtatg tcaactggat taaggaaaaa 1380

acaaagctca ctagctccag cagcaaggcc cctcccccga gcctgccctc cccaagcagg 1440

ctgcctgggc cctccgacac accaatcctg ccacagtgat gaaggtctgg atccgcggcc 1500

gc 1502

<210> 58
<211> 489
<212> PRT
<213> artificial

<220>
<223> factor IX-CTP

<400> 58

```
Met Gln Arg Val Asn Met Ile Met Ala Glu Ser Pro Gly Leu Ile Thr
1               5                   10                  15

Ile Cys Leu Leu Gly Tyr Leu Leu Ser Ala Glu Cys Thr Val Phe Leu
            20                  25                  30

Asp His Glu Asn Ala Asn Lys Ile Leu Asn Arg Pro Lys Arg Tyr Asn
        35                  40                  45

Ser Gly Lys Leu Glu Glu Phe Val Gln Gly Asn Leu Glu Arg Glu Cys
    50                  55                  60

Met Glu Glu Lys Cys Ser Phe Glu Glu Ala Arg Glu Val Phe Glu Asn
65                  70                  75                  80

Thr Glu Arg Thr Thr Glu Phe Trp Lys Gln Tyr Val Asp Gly Asp Gln
                85                  90                  95

Cys Glu Ser Asn Pro Cys Leu Asn Gly Gly Ser Cys Lys Asp Asp Ile
            100                 105                 110

Asn Ser Tyr Glu Cys Trp Cys Pro Phe Gly Phe Glu Gly Lys Asn Cys
        115                 120                 125

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

Cys Lys Asn Ser Ala Asp Asn Lys Val Val Cys Ser Cys Thr Glu Gly
145                 150                 155                 160

Tyr Arg Leu Ala Glu Asn Gln Lys Ser Cys Glu Pro Ala Val Pro Phe
                165                 170                 175

Pro Cys Gly Arg Val Ser Val Ser Gln Thr Ser Lys Leu Thr Arg Ala
            180                 185                 190

Glu Thr Val Phe Pro Asp Val Asp Tyr Val Asn Ser Thr Glu Ala Glu
        195                 200                 205

Thr Ile Leu Asp Asn Ile Thr Gln Ser Thr Gln Ser Phe Asn Asp Phe
    210                 215                 220

Thr Arg Val Val Gly Gly Glu Asp Ala Lys Pro Gly Gln Phe Pro Trp
225                 230                 235                 240

Gln Val Val Leu Asn Gly Lys Val Asp Ala Phe Cys Gly Gly Ser Ile
                245                 250                 255

Val Asn Glu Lys Trp Ile Val Thr Ala Ala His Cys Val Glu Thr Gly
            260                 265                 270
```

```
Val Lys Ile Thr Val Val Ala Gly Glu His Asn Ile Glu Glu Thr Glu
        275                 280                 285

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

Tyr Asn Ala Ala Ile Asn Lys Tyr Asn His Asp Ile Ala Leu Leu Glu
305                 310                 315                 320

Leu Asp Glu Pro Leu Val Leu Asn Ser Tyr Val Thr Pro Ile Cys Ile
                325                 330                 335

Ala Asp Lys Glu Tyr Thr Asn Ile Phe Leu Lys Phe Gly Ser Gly Tyr
            340                 345                 350

Val Ser Gly Trp Gly Arg Val Phe His Lys Gly Arg Ser Ala Leu Val
        355                 360                 365

Leu Gln Tyr Leu Arg Val Pro Leu Val Asp Arg Ala Thr Cys Leu Arg
    370                 375                 380

Ser Thr Lys Phe Thr Ile Tyr Asn Asn Met Phe Cys Ala Gly Phe His
385                 390                 395                 400

Glu Gly Gly Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro His Val
                405                 410                 415

Thr Glu Val Glu Gly Thr Ser Phe Leu Thr Gly Ile Ile Ser Trp Gly
            420                 425                 430

Glu Glu Cys Ala Met Lys Gly Lys Tyr Gly Ile Tyr Thr Lys Val Ser
        435                 440                 445

Arg Tyr Val Asn Trp Ile Lys Glu Lys Thr Lys Leu Thr Ser Ser Ser
    450                 455                 460

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
465                 470                 475                 480

Pro Ser Asp Thr Pro Ile Leu Pro Gln
                485
```

<210> 59
<211> 1585
<212> DNA
<213> artificial

<220>
<223> factor IX-CTP-CTP

<400> 59

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gcgatcgcca tgcagcgcgt gaacatgatc atggcagaat caccaggcct catcaccatc       60

tgccttttag gatatctact cagtgctgaa tgtacagttt ttcttgatca tgaaaacgcc      120
```

aacaaaattc tgaatcggcc aaagaggtat aattcaggta aattggaaga gtttgttcaa 180

gggaaccttg agagagaatg tatggaagaa aagtgtagtt ttgaagaagc acgagaagtt 240

tttgaaaaca ctgaaagaac aactgaattt tggaagcagt atgttgatgg agatcagtgt 300

gagtccaatc catgtttaaa tggcggcagt tgcaaggatg acattaattc ctatgaatgt 360

tggtgtccct ttggatttga aggaaagaac tgtgaattag atgtaacatg taacattaag 420

aatggcagat gcgagcagtt ttgtaaaaat agtgctgata acaaggtggt ttgctcctgt 480

actgagggat atcgacttgc agaaaaccag aagtcctgtg aaccagcagt gccatttcca 540

tgtggaagag tttctgtttc acaaacttct aagctcaccc gtgctgagac tgtttttcct 600

gatgtggact atgtaaattc tactgaagct gaaaccattt tggataacat cactcaaagc 660

acccaatcat ttaatgactt cactcgagtt gttggtggag aagatgccaa accaggtcaa 720

ttcccttggc aggttgtttt gaatggtaaa gttgatgcat tctgtggagg ctctatcgtt 780

aatgaaaaat ggattgtaac tgctgcccac tgtgttgaaa ctggtgttaa aattacagtt 840

gtcgcaggtg aacataatat tgaggagaca gaacatacag agcaaaagcg aaatgtgatt 900

cgaattattc ctcaccacaa ctacaatgca gctattaata agtacaacca tgacattgcc 960

cttctggaac tggacgaacc cttagtgcta aacagctacg ttacacctat ttgcattgct 1020

acaaggaata cacgaacatc ttcctcaaat ttggatctgg ctatgtaagt ggctggggaa 1080

gagtcttcca caaagggaga tcagctttag ttcttcagta ccttagagtt ccacttgttg 1140

accgagccac atgtcttcga tctacaaagt tcaccatcta taacaacatg ttctgtgctg 1200

gcttccatga aggaggtaga gattcatgtc aaggagatag tgggggaccc catgttactg 1260

aagtggaagg gaccagtttc ttaactggaa ttattagctg gggtgaagag tgtgcaatga 1320

aaggcaaata tggaatatat accaaggtat cccggtatgt caactggatt aaggaaaaaa 1380

caaagctcac tagctccagc agcaaggccc ctcccccgag cctgccctcc ccaagcaggc 1440

tgcctgggcc ctccgacaca ccaatcctgc cacagagcag ctcctctaag gcccctcctc 1500

catccctgcc atccccctcc cggctgcctg gcccctctga cacccctatc ctgcctcagt 1560

gatgaaggtc tggatccgcg gccgc 1585

<210> 60
<211> 517
<212> PRT
<213> artificial

<220>
<223> factor IX-CTP-CTP

<400> 60

Met Gln Arg Val Asn Met Ile Met Ala Glu Ser Pro Gly Leu Ile Thr
1 5 10 15

Ile Cys Leu Leu Gly Tyr Leu Leu Ser Ala Glu Cys Thr Val Phe Leu
20 25 30

```
Asp His Glu Asn Ala Asn Lys Ile Leu Asn Arg Pro Lys Arg Tyr Asn
        35                  40                  45

Ser Gly Lys Leu Glu Glu Phe Val Gln Gly Asn Leu Glu Arg Glu Cys
    50                  55                  60

Met Glu Glu Lys Cys Ser Phe Glu Glu Ala Arg Glu Val Phe Glu Asn
65                  70                  75                  80

Thr Glu Arg Thr Thr Glu Phe Trp Lys Gln Tyr Val Asp Gly Asp Gln
                85                  90                  95

Cys Glu Ser Asn Pro Cys Leu Asn Gly Gly Ser Cys Lys Asp Asp Ile
            100                 105                 110

Asn Ser Tyr Glu Cys Trp Cys Pro Phe Gly Phe Glu Gly Lys Asn Cys
        115                 120                 125

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

Cys Lys Asn Ser Ala Asp Asn Lys Val Val Cys Ser Cys Thr Glu Gly
145                 150                 155                 160

Tyr Arg Leu Ala Glu Asn Gln Lys Ser Cys Glu Pro Ala Val Pro Phe
                165                 170                 175

Pro Cys Gly Arg Val Ser Val Ser Gln Thr Ser Lys Leu Thr Arg Ala
            180                 185                 190

Glu Thr Val Phe Pro Asp Val Asp Tyr Val Asn Ser Thr Glu Ala Glu
        195                 200                 205

Thr Ile Leu Asp Asn Ile Thr Gln Ser Thr Gln Ser Phe Asn Asp Phe
    210                 215                 220

Thr Arg Val Val Gly Gly Glu Asp Ala Lys Pro Gly Gln Phe Pro Trp
225                 230                 235                 240

Gln Val Val Leu Asn Gly Lys Val Asp Ala Phe Cys Gly Gly Ser Ile
                245                 250                 255

Val Asn Glu Lys Trp Ile Val Thr Ala Ala His Cys Val Glu Thr Gly
            260                 265                 270

Val Lys Ile Thr Val Val Ala Gly Glu His Asn Ile Glu Glu Thr Glu
        275                 280                 285

His Thr Glu Gln Lys Arg Asn Val Ile Arg Ile Ile Pro His His Asn
    290                 295                 300
```

```
Tyr Asn Ala Ala Ile Asn Lys Tyr Asn His Asp Ile Ala Leu Leu Glu
305                 310                 315                 320

Leu Asp Glu Pro Leu Val Leu Asn Ser Tyr Val Thr Pro Ile Cys Ile
                325                 330                 335

Ala Asp Lys Glu Tyr Thr Asn Ile Phe Leu Lys Phe Gly Ser Gly Tyr
            340                 345                 350

Val Ser Gly Trp Gly Arg Val Phe His Lys Gly Arg Ser Ala Leu Val
        355                 360                 365

Leu Gln Tyr Leu Arg Val Pro Leu Val Asp Arg Ala Thr Cys Leu Arg
    370                 375                 380

Ser Thr Lys Phe Thr Ile Tyr Asn Asn Met Phe Cys Ala Gly Phe His
385                 390                 395                 400

Glu Gly Gly Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro His Val
                405                 410                 415

Thr Glu Val Glu Gly Thr Ser Phe Leu Thr Gly Ile Ile Ser Trp Gly
            420                 425                 430

Glu Glu Cys Ala Met Lys Gly Lys Tyr Gly Ile Tyr Thr Lys Val Ser
        435                 440                 445

Arg Tyr Val Asn Trp Ile Lys Glu Lys Thr Lys Leu Thr Ser Ser Ser
    450                 455                 460

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
465                 470                 475                 480

Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro
                485                 490                 495

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
            500                 505                 510

Pro Ile Leu Pro Gln
        515
```

<210> 61
<211> 545
<212> PRT
<213> artificial

<220>
<223> factor IX-CTP-CTP-CTP

<400> 61

```
Met Gln Arg Val Asn Met Ile Met Ala Glu Ser Pro Gly Leu Ile Thr
1               5                   10                  15

Ile Cys Leu Leu Gly Tyr Leu Leu Ser Ala Glu Cys Thr Val Phe Leu
            20                  25                  30

Asp His Glu Asn Ala Asn Lys Ile Leu Asn Arg Pro Lys Arg Tyr Asn
        35                  40                  45

Ser Gly Lys Leu Glu Glu Phe Val Gln Gly Asn Leu Glu Arg Glu Cys
    50                  55                  60

Met Glu Glu Lys Cys Ser Phe Glu Glu Ala Arg Glu Val Phe Glu Asn
65                  70                  75                  80

Thr Glu Arg Thr Thr Glu Phe Trp Lys Gln Tyr Val Asp Gly Asp Gln
                85                  90                  95

Cys Glu Ser Asn Pro Cys Leu Asn Gly Gly Ser Cys Lys Asp Asp Ile
            100                 105                 110

Asn Ser Tyr Glu Cys Trp Cys Pro Phe Gly Phe Glu Gly Lys Asn Cys
        115                 120                 125

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

Cys Lys Asn Ser Ala Asp Asn Lys Val Val Cys Ser Cys Thr Glu Gly
145                 150                 155                 160

Tyr Arg Leu Ala Glu Asn Gln Lys Ser Cys Glu Pro Ala Val Pro Phe
                165                 170                 175

Pro Cys Gly Arg Val Ser Val Ser Gln Thr Ser Lys Leu Thr Arg Ala
            180                 185                 190

Glu Thr Val Phe Pro Asp Val Asp Tyr Val Asn Ser Thr Glu Ala Glu
        195                 200                 205

Thr Ile Leu Asp Asn Ile Thr Gln Ser Thr Gln Ser Phe Asn Asp Phe
    210                 215                 220

Thr Arg Val Val Gly Gly Glu Asp Ala Lys Pro Gly Gln Phe Pro Trp
225                 230                 235                 240

Gln Val Val Leu Asn Gly Lys Val Asp Ala Phe Cys Gly Gly Ser Ile
                245                 250                 255

Val Asn Glu Lys Trp Ile Val Thr Ala Ala His Cys Val Glu Thr Gly
            260                 265                 270
```

```
Val Lys Ile Thr Val Val Ala Gly Glu His Asn Ile Glu Glu Thr Glu
        275                 280                 285

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

Tyr Asn Ala Ala Ile Asn Lys Tyr Asn His Asp Ile Ala Leu Leu Glu
305                 310                 315                 320

Leu Asp Glu Pro Leu Val Leu Asn Ser Tyr Val Thr Pro Ile Cys Ile
                325                 330                 335

Ala Asp Lys Glu Tyr Thr Asn Ile Phe Leu Lys Phe Gly Ser Gly Tyr
            340                 345                 350

Val Ser Gly Trp Gly Arg Val Phe His Lys Gly Arg Ser Ala Leu Val
        355                 360                 365

Leu Gln Tyr Leu Arg Val Pro Leu Val Asp Arg Ala Thr Cys Leu Arg
    370                 375                 380

Ser Thr Lys Phe Thr Ile Tyr Asn Asn Met Phe Cys Ala Gly Phe His
385                 390                 395                 400

Glu Gly Gly Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro His Val
                405                 410                 415

Thr Glu Val Glu Gly Thr Ser Phe Leu Thr Gly Ile Ile Ser Trp Gly
            420                 425                 430

Glu Glu Cys Ala Met Lys Gly Lys Tyr Gly Ile Tyr Thr Lys Val Ser
        435                 440                 445

Arg Tyr Val Asn Trp Ile Lys Glu Lys Thr Lys Leu Thr Ser Ser Ser
    450                 455                 460

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
465                 470                 475                 480

Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro
                485                 490                 495

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
            500                 505                 510

Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
        515                 520                 525

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
    530                 535                 540
```

Gln
545

<210> 62
<211> 573
<212> PRT
<213> artificial

<220>
<223> factor IX-CTP-CTP-CTP-CTP

<400> 62

Met Gln Arg Val Asn Met Ile Met Ala Glu Ser Pro Gly Leu Ile Thr
1 5 10 15

Ile Cys Leu Leu Gly Tyr Leu Leu Ser Ala Glu Cys Thr Val Phe Leu
20 25 30

Asp His Glu Asn Ala Asn Lys Ile Leu Asn Arg Pro Lys Arg Tyr Asn
35 40 45

Ser Gly Lys Leu Glu Glu Phe Val Gln Gly Asn Leu Glu Arg Glu Cys
50 55 60

Met Glu Glu Lys Cys Ser Phe Glu Glu Ala Arg Glu Val Phe Glu Asn
65 70 75 80

Thr Glu Arg Thr Thr Glu Phe Trp Lys Gln Tyr Val Asp Gly Asp Gln
85 90 95

Cys Glu Ser Asn Pro Cys Leu Asn Gly Gly Ser Cys Lys Asp Asp Ile
100 105 110

Asn Ser Tyr Glu Cys Trp Cys Pro Phe Gly Phe Glu Gly Lys Asn Cys
115 120 125

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

Cys Lys Asn Ser Ala Asp Asn Lys Val Val Cys Ser Cys Thr Glu Gly
145 150 155 160

Tyr Arg Leu Ala Glu Asn Gln Lys Ser Cys Glu Pro Ala Val Pro Phe
165 170 175

Pro Cys Gly Arg Val Ser Val Ser Gln Thr Ser Lys Leu Thr Arg Ala
180 185 190

Glu Thr Val Phe Pro Asp Val Asp Tyr Val Asn Ser Thr Glu Ala Glu
195 200 205

Thr Ile Leu Asp Asn Ile Thr Gln Ser Thr Gln Ser Phe Asn Asp Phe
210 215 220

```
Thr Arg Val Val Gly Gly Glu Asp Ala Lys Pro Gly Gln Phe Pro Trp
225                 230                 235                 240

Gln Val Val Leu Asn Gly Lys Val Asp Ala Phe Cys Gly Gly Ser Ile
                245                 250                 255

Val Asn Glu Lys Trp Ile Val Thr Ala Ala His Cys Val Glu Thr Gly
            260                 265                 270

Val Lys Ile Thr Val Val Ala Gly Glu His Asn Ile Glu Glu Thr Glu
        275                 280                 285

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

Tyr Asn Ala Ala Ile Asn Lys Tyr Asn His Asp Ile Ala Leu Leu Glu
305                 310                 315                 320

Leu Asp Glu Pro Leu Val Leu Asn Ser Tyr Val Thr Pro Ile Cys Ile
                325                 330                 335

Ala Asp Lys Glu Tyr Thr Asn Ile Phe Leu Lys Phe Gly Ser Gly Tyr
            340                 345                 350

Val Ser Gly Trp Gly Arg Val Phe His Lys Gly Arg Ser Ala Leu Val
        355                 360                 365

Leu Gln Tyr Leu Arg Val Pro Leu Val Asp Arg Ala Thr Cys Leu Arg
    370                 375                 380

Ser Thr Lys Phe Thr Ile Tyr Asn Asn Met Phe Cys Ala Gly Phe His
385                 390                 395                 400

Glu Gly Gly Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro His Val
                405                 410                 415

Thr Glu Val Glu Gly Thr Ser Phe Leu Thr Gly Ile Ile Ser Trp Gly
            420                 425                 430

Glu Glu Cys Ala Met Lys Gly Lys Tyr Gly Ile Tyr Thr Lys Val Ser
        435                 440                 445

Arg Tyr Val Asn Trp Ile Lys Glu Lys Thr Lys Leu Thr Ser Ser Ser
    450                 455                 460

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
465                 470                 475                 480

Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro
                485                 490                 495
```

```
Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
            500                 505                 510

Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
        515                 520                 525

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
    530                 535                 540

Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
545                 550                 555                 560

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln
                565                 570
```

<210> 63
<211> 601
<212> PRT
<213> artificial

<220>
<223> factor IX-CTP-CTP-CTP-CTP-CTP

<400> 63

```
Met Gln Arg Val Asn Met Ile Met Ala Glu Ser Pro Gly Leu Ile Thr
1               5                   10                  15

Ile Cys Leu Leu Gly Tyr Leu Leu Ser Ala Glu Cys Thr Val Phe Leu
            20                  25                  30

Asp His Glu Asn Ala Asn Lys Ile Leu Asn Arg Pro Lys Arg Tyr Asn
        35                  40                  45

Ser Gly Lys Leu Glu Glu Phe Val Gln Gly Asn Leu Glu Arg Glu Cys
    50                  55                  60

Met Glu Glu Lys Cys Ser Phe Glu Glu Ala Arg Glu Val Phe Glu Asn
65                  70                  75                  80

Thr Glu Arg Thr Thr Glu Phe Trp Lys Gln Tyr Val Asp Gly Asp Gln
                85                  90                  95

Cys Glu Ser Asn Pro Cys Leu Asn Gly Gly Ser Cys Lys Asp Asp Ile
            100                 105                 110

Asn Ser Tyr Glu Cys Trp Cys Pro Phe Gly Phe Glu Gly Lys Asn Cys
        115                 120                 125

Glu Leu Asp Val Thr Cys Asn Ile Lys Asn Gly Arg Cys Glu Gln Phe
    130                 135                 140
```

```
Cys Lys Asn Ser Ala Asp Asn Lys Val Val Cys Ser Cys Thr Glu Gly
145                 150                 155                 160

Tyr Arg Leu Ala Glu Asn Gln Lys Ser Cys Glu Pro Ala Val Pro Phe
                165                 170                 175

Pro Cys Gly Arg Val Ser Val Ser Gln Thr Ser Lys Leu Thr Arg Ala
            180                 185                 190

Glu Thr Val Phe Pro Asp Val Asp Tyr Val Asn Ser Thr Glu Ala Glu
        195                 200                 205

Thr Ile Leu Asp Asn Ile Thr Gln Ser Thr Gln Ser Phe Asn Asp Phe
    210                 215                 220

Thr Arg Val Val Gly Gly Glu Asp Ala Lys Pro Gly Gln Phe Pro Trp
225                 230                 235                 240

Gln Val Val Leu Asn Gly Lys Val Asp Ala Phe Cys Gly Gly Ser Ile
                245                 250                 255

Val Asn Glu Lys Trp Ile Val Thr Ala Ala His Cys Val Glu Thr Gly
            260                 265                 270

Val Lys Ile Thr Val Val Ala Gly Glu His Asn Ile Glu Glu Thr Glu
        275                 280                 285

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

Tyr Asn Ala Ala Ile Asn Lys Tyr Asn His Asp Ile Ala Leu Leu Glu
305                 310                 315                 320

Leu Asp Glu Pro Leu Val Leu Asn Ser Tyr Val Thr Pro Ile Cys Ile
                325                 330                 335

Ala Asp Lys Glu Tyr Thr Asn Ile Phe Leu Lys Phe Gly Ser Gly Tyr
            340                 345                 350

Val Ser Gly Trp Gly Arg Val Phe His Lys Gly Arg Ser Ala Leu Val
        355                 360                 365

Leu Gln Tyr Leu Arg Val Pro Leu Val Asp Arg Ala Thr Cys Leu Arg
    370                 375                 380

Ser Thr Lys Phe Thr Ile Tyr Asn Asn Met Phe Cys Ala Gly Phe His
385                 390                 395                 400

Glu Gly Gly Arg Asp Ser Cys Gln Gly Asp Ser Gly Gly Pro His Val
                405                 410                 415
```

Thr Glu Val Glu Gly Thr Ser Phe Leu Thr Gly Ile Ile Ser Trp Gly
420 425 430

Glu Glu Cys Ala Met Lys Gly Lys Tyr Gly Ile Tyr Thr Lys Val Ser
435 440 445

Arg Tyr Val Asn Trp Ile Lys Glu Lys Thr Lys Leu Thr Ser Ser Ser
450 455 460

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
465 470 475 480

Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro
485 490 495

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
500 505 510

Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
515 520 525

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
530 535 540

Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser
545 550 555 560

Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser
565 570 575

Ser Lys Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly
580 585 590

Pro Ser Asp Thr Pro Ile Leu Pro Gln
595 600

<210> 64
<211> 2413
<212> DNA
<213> Homo sapiens

<400> 64
tctagagtcg accccgccat ggagctgagg ccctggttgc tatgggtggt agcagcaaca 60

ggaaccttgg tcctgctagc agctgatgct cagggccaga aggtcttcac caacacgtgg 120

gctgtgcgca tccctggagg cccagcggtg gccaacagtg tggcacggaa gcatgggttc 180

ctcaacctgg gccagatctt cggggactat taccacttct ggcatcgagg agtgacgaag 240

cggtccctgt cgcctcaccg cccgcggcac agccggctgc agagggagcc tcaagtacag 300

tggctggaac agcaggtggc aaagcgacgg actaaacggg acgtgtacca ggagcccaca 360

gaccccaagt ttcctcagca gtggtacctg tctggtgtca ctcagcggga cctgaatgtg 420

aaggcggcct gggcgcaggg ctacacaggg cacggcattg tggtctccat tctggacgat 480

ggcatcgaga agaaccaccc ggacttggca ggcaattatg atcctggggc cagttttgat 540

gtcaatgacc aggaccctga cccccagcct cggtacacac agatgaatga caacaggcac 600

ggcacacggt gtgcggggga agtggctgcg gtggccaaca acggtgtctg tggtgtaggt 660

gtggcctaca acgcccgcat tggaggggtg cgcatgctgg atggcgaggt gacagatgca 720

gtggaggcac gctcgctggg cctgaacccc aaccacatcc acatctacag tgccagctgg 780

ggccccgagg atgacggcaa gacagtggat gggccagccc gcctcgccga ggaggccttc 840

ttccgtgggg ttagccaggg ccgaggggg ctgggctcca tctttgtctg ggcctcgggg 900

aacgggggcc gggaacatga cagctgcaac tgcgacggct acaccaacag tatctacacg 960

ctgtccatca gcagcgccac gcagtttggc aacgtgccgt ggtacagcga ggcctgctcg 1020

tccacactgg ccacgaccta cagcagtggc aaccagaatg agaagcagat cgtgacgact 1080

gacttgcggc agaagtgcac ggagtctcac acgggcacct cagcctctgc ccccttagca 1140

gccggcatca ttgctctcac cctggaggcc aataagaacc tcacatggcg ggacatgcaa 1200

cacctggtgg tacagacctc gaagccagcc cacctcaatg ccaacgactg ggccaccaat 1260

ggtgtgggcc ggaaagtgag ccactcatat ggctacgggc ttttggacgc aggcgccatg 1320

gtggccctgg cccagaattg gaccacagtg gcccccccagc ggaagtgcat catcgacatc 1380

ctcaccgagc ccaaagacat cgggaaacgg ctcgaggtgc ggaagaccgt gaccgcgtgc 1440

ctgggcgagc ccaaccacat cactcggctg gagcacgctc aggcgcggct caccctgtcc 1500

tataatcgcc gtggcgacct ggccatccac ctggtcagcc ccatgggcac ccgctccacc 1560

ctgctggcag ccaggccaca tgactactcc gcagatgggt ttaatgactg ggccttcatg 1620

acaactcatt cctgggatga ggatccctct ggcgagtggg tcctagagat tgaaaacacc 1680

agcgaagcca acaactatgg gacgctgacc aagttcaccc tcgtactcta tggcaccgcc 1740

cctgaggggc tgcccgtacc tccagaaagc agtggctgca agaccctcac gtccagtcag 1800

gcctgtgtgg tgtgcgagga aggcttctcc ctgcaccaga agagctgtgt ccagcactgc 1860

cctccaggct tcgcccccca agtcctcgat acgcactata gcaccgagaa tgacgtggag 1920

accatccggg ccagcgtctg cgccccctgc cacgcctcat gtgccacatg ccaggggccg 1980

gccctgacag actgcctcag ctgccccagc cacgcctcct tggaccctgt ggagcagact 2040

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cccccggagg tggaggcggg gcaacggctg cgggcagggc tgctgccctc acacctgcct 2160

gaggtggtgg ccggcctcag ctgcgccttc atcgtgctgg tcttcgtcac tgtcttcctg 2220

gtcctgcagc tgcgctctgg ctttagtttt cgggggggtga aggtgtacac catggaccgt 2280

ggcctcatct cctacaaggg gctgccccct gaagcctggc aggaggagtg cccgtctgac 2340

tcagaagagg acgagggccg gggcgagagg accgccttta tcaaagacca gagcgccctc 2400

tgaacgcggc cgc 2413

<210> 65
<211> 794
<212> PRT
<213> Homo sapiens

<400> 65

Met Glu Leu Arg Pro Trp Leu Leu Trp Val Val Ala Ala Thr Gly Thr
1 5 10 15

Leu Val Leu Leu Ala Ala Asp Ala Gln Gly Gln Lys Val Phe Thr Asn
20 25 30

Thr Trp Ala Val Arg Ile Pro Gly Gly Pro Ala Val Ala Asn Ser Val
35 40 45

Ala Arg Lys His Gly Phe Leu Asn Leu Gly Gln Ile Phe Gly Asp Tyr
50 55 60

Tyr His Phe Trp His Arg Gly Val Thr Lys Arg Ser Leu Ser Pro His
65 70 75 80

Arg Pro Arg His Ser Arg Leu Gln Arg Glu Pro Gln Val Gln Trp Leu
85 90 95

Glu Gln Gln Val Ala Lys Arg Arg Thr Lys Arg Asp Val Tyr Gln Glu
100 105 110

Pro Thr Asp Pro Lys Phe Pro Gln Gln Trp Tyr Leu Ser Gly Val Thr
115 120 125

Gln Arg Asp Leu Asn Val Lys Ala Ala Trp Ala Gln Gly Tyr Thr Gly
130 135 140

His Gly Ile Val Val Ser Ile Leu Asp Asp Gly Ile Glu Lys Asn His
145 150 155 160

Pro Asp Leu Ala Gly Asn Tyr Asp Pro Gly Ala Ser Phe Asp Val Asn
165 170 175

Asp Gln Asp Pro Asp Pro Gln Pro Arg Tyr Thr Gln Met Asn Asp Asn
180 185 190

Arg His Gly Thr Arg Cys Ala Gly Glu Val Ala Ala Val Ala Asn Asn
195 200 205

Gly Val Cys Gly Val Gly Val Ala Tyr Asn Ala Arg Ile Gly Gly Val
210 215 220

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

```
Gly Leu Asn Pro Asn His Ile His Ile Tyr Ser Ala Ser Trp Gly Pro
               245                 250                 255

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

Ala Phe Phe Arg Gly Val Ser Gln Gly Arg Gly Gly Leu Gly Ser Ile
        275                 280                 285

Phe Val Trp Ala Ser Gly Asn Gly Gly Arg Glu His Asp Ser Cys Asn
    290                 295                 300

Cys Asp Gly Tyr Thr Asn Ser Ile Tyr Thr Leu Ser Ile Ser Ser Ala
305                 310                 315                 320

Thr Gln Phe Gly Asn Val Pro Trp Tyr Ser Glu Ala Cys Ser Ser Thr
               325                 330                 335

Leu Ala Thr Thr Tyr Ser Ser Gly Asn Gln Asn Glu Lys Gln Ile Val
            340                 345                 350

Thr Thr Asp Leu Arg Gln Lys Cys Thr Glu Ser His Thr Gly Thr Ser
        355                 360                 365

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

Asn Lys Asn Leu Thr Trp Arg Asp Met Gln His Leu Val Val Gln Thr
385                 390                 395                 400

Ser Lys Pro Ala His Leu Asn Ala Asn Asp Trp Ala Thr Asn Gly Val
               405                 410                 415

Gly Arg Lys Val Ser His Ser Tyr Gly Tyr Gly Leu Leu Asp Ala Gly
            420                 425                 430

Ala Met Val Ala Leu Ala Gln Asn Trp Thr Thr Val Ala Pro Gln Arg
        435                 440                 445

Lys Cys Ile Ile Asp Ile Leu Thr Glu Pro Lys Asp Ile Gly Lys Arg
    450                 455                 460

Leu Glu Val Arg Lys Thr Val Thr Ala Cys Leu Gly Glu Pro Asn His
465                 470                 475                 480

Ile Thr Arg Leu Glu His Ala Gln Ala Arg Leu Thr Leu Ser Tyr Asn
               485                 490                 495

Arg Arg Gly Asp Leu Ala Ile His Leu Val Ser Pro Met Gly Thr Arg
            500                 505                 510
```

```
Ser Thr Leu Leu Ala Ala Arg Pro His Asp Tyr Ser Ala Asp Gly Phe
        515                 520                 525

Asn Asp Trp Ala Phe Met Thr Thr His Ser Trp Asp Glu Asp Pro Ser
    530                 535                 540

Gly Glu Trp Val Leu Glu Ile Glu Asn Thr Ser Glu Ala Asn Asn Tyr
545                 550                 555                 560

Gly Thr Leu Thr Lys Phe Thr Leu Val Leu Tyr Gly Thr Ala Pro Glu
                565                 570                 575

Gly Leu Pro Val Pro Pro Glu Ser Ser Gly Cys Lys Thr Leu Thr Ser
            580                 585                 590

Ser Gln Ala Cys Val Val Cys Glu Glu Gly Phe Ser Leu His Gln Lys
        595                 600                 605

Ser Cys Val Gln His Cys Pro Pro Gly Phe Ala Pro Gln Val Leu Asp
    610                 615                 620

Thr His Tyr Ser Thr Glu Asn Asp Val Glu Thr Ile Arg Ala Ser Val
625                 630                 635                 640

Cys Ala Pro Cys His Ala Ser Cys Ala Thr Cys Gln Gly Pro Ala Leu
                645                 650                 655

Thr Asp Cys Leu Ser Cys Pro Ser His Ala Ser Leu Asp Pro Val Glu
            660                 665                 670

Gln Thr Cys Ser Arg Gln Ser Gln Ser Ser Arg Glu Ser Pro Pro Gln
        675                 680                 685

Gln Gln Pro Pro Arg Leu Pro Pro Glu Val Glu Ala Gly Gln Arg Leu
    690                 695                 700

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

Ser Cys Ala Phe Ile Val Leu Val Phe Val Thr Val Phe Leu Val Leu
                725                 730                 735

Gln Leu Arg Ser Gly Phe Ser Phe Arg Gly Val Lys Val Tyr Thr Met
            740                 745                 750

Asp Arg Gly Leu Ile Ser Tyr Lys Gly Leu Pro Pro Glu Ala Trp Gln
        755                 760                 765

Glu Glu Cys Pro Ser Asp Ser Glu Glu Asp Glu Gly Arg Gly Glu Arg
    770                 775                 780
```

Thr Ala Phe Ile Lys Asp Gln Ser Ala Leu
785 790

<210> 66
<211> 249
<212> PRT
<213> Artificial

<220>
<223> CTP-CTP-EPO

<400> 66

Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1 5 10 15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ser Ser Ser Ser Lys
20 25 30

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
35 40 45

Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro
50 55 60

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
65 70 75 80

Leu Pro Gln Ala Pro Pro Arg Leu Ile Cys Asp Ser Arg Val Leu Glu
85 90 95

Arg Tyr Leu Leu Glu Ala Lys Glu Ala Glu Asn Ile Thr Thr Gly Cys
100 105 110

Ala Glu His Cys Ser Leu Asn Glu Asn Ile Thr Val Pro Asp Thr Lys
115 120 125

Val Asn Phe Tyr Ala Trp Lys Arg Met Glu Val Gly Gln Gln Ala Val
130 135 140

Glu Val Trp Gln Gly Leu Ala Leu Leu Ser Glu Ala Val Leu Arg Gly
145 150 155 160

Gln Ala Leu Leu Val Asn Ser Ser Gln Pro Trp Glu Pro Leu Gln Leu
165 170 175

His Val Asp Lys Ala Val Ser Gly Leu Arg Ser Leu Thr Thr Leu Leu
180 185 190

Arg Ala Leu Gly Ala Gln Lys Glu Ala Ile Ser Pro Pro Asp Ala Ala
195 200 205

Ser Ala Ala Pro Leu Arg Thr Ile Thr Ala Asp Thr Phe Arg Lys Leu
210 215 220

Phe Arg Val Tyr Ser Asn Phe Leu Arg Gly Lys Leu Lys Leu Tyr Thr
225 230 235 240

Gly Glu Ala Cys Arg Thr Gly Asp Arg
245

<210> 67
<211> 762
<212> DNA
<213> Artificial

<220>
<223> CTP-CTP-EPO

<400> 67
atgggcgtgc acgagtgtcc tgcttggctg tggctgctgc tgagcctgct gtccctgcct 60

ctgggcctgc ctgtgctggg cagcagcagc tctaaggccc ctccacccag cctgcccagc 120

ccttctagac tgcctggccc cagcgacacc cccatcctgc ctcagagcag cagcagcaag 180

gccccaccac catccctgcc tagccccagc agactgccag gcccttccga taccccaatc 240

ctgccccagg cccctcccag actgatctgc gacagccggg tgctggaaag atacctgctg 300

gaagccaaag aggccgagaa catcaccacc ggctgcgccg agcactgcag cctgaacgag 360

aatatcaccg tgcccgacac caaagtgaac ttctacgcct ggaagcggat ggaagtgggc 420

cagcaggccg tggaagtgtg gcagggactg gccctgctga gcgaggccgt gctgagagga 480

caggccctgc tggtgaacag cagccagccc tgggagcccc tgcagctgca tgtggataag 540

gccgtgtccg gcctgcggag cctgaccaca ctgctgagag ccctgggcgc tcagaaagag 600

gccatctctc cccctgatgc cgcctctgcc gcccctctga gaaccatcac cgccgacacc 660

ttccggaagc tgttccgggt gtacagcaac ttcctgcggg gcaagctgaa gctgtacacc 720

ggcgaggcct gccggaccgg cgatagataa gcttggcgcg cc 762

<210> 68
<211> 305
<212> PRT
<213> Artificial

<220>
<223> CTP-CTP-EPO-CTP-CTP

<400> 68

Met Gly Val His Glu Cys Pro Ala Trp Leu Trp Leu Leu Leu Ser Leu
1 5 10 15

Leu Ser Leu Pro Leu Gly Leu Pro Val Leu Gly Ser Ser Ser Ser Lys
20 25 30

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
35 40 45

```
Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro
    50                  55                  60

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
65                  70                  75                  80

Leu Pro Gln Ala Pro Pro Arg Leu Ile Cys Asp Ser Arg Val Leu Glu
                85                  90                  95

Arg Tyr Leu Leu Glu Ala Lys Glu Ala Glu Asn Ile Thr Thr Gly Cys
            100                 105                 110

Ala Glu His Cys Ser Leu Asn Glu Asn Ile Thr Val Pro Asp Thr Lys
        115                 120                 125

Val Asn Phe Tyr Ala Trp Lys Arg Met Glu Val Gly Gln Gln Ala Val
    130                 135                 140

Glu Val Trp Gln Gly Leu Ala Leu Leu Ser Glu Ala Val Leu Arg Gly
145                 150                 155                 160

Gln Ala Leu Leu Val Asn Ser Ser Gln Pro Trp Glu Pro Leu Gln Leu
                165                 170                 175

His Val Asp Lys Ala Val Ser Gly Leu Arg Ser Leu Thr Thr Leu Leu
            180                 185                 190

Arg Ala Leu Gly Ala Gln Lys Glu Ala Ile Ser Pro Pro Asp Ala Ala
        195                 200                 205

Ser Ala Ala Pro Leu Arg Thr Ile Thr Ala Asp Thr Phe Arg Lys Leu
    210                 215                 220

Phe Arg Val Tyr Ser Asn Phe Leu Arg Gly Lys Leu Lys Leu Tyr Thr
225                 230                 235                 240

Gly Glu Ala Cys Arg Thr Gly Asp Arg Ser Ser Ser Ser Lys Ala Pro
                245                 250                 255

Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr
            260                 265                 270

Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro Ser Leu
        275                 280                 285

Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile Leu Pro
    290                 295                 300

Gln
305
```

<210> 69
<211> 930
<212> DNA
<213> Artificial

<220>
<223> CTP-CTP-EPO-CTP-CTP

<400> 69
atgggcgtgc acgagtgtcc tgcttggctg tggctgctgc tgagcctgct gtccctgcct 60

ctgggcctgc ctgtgctggg cagcagcagc tctaaggccc ctccacccag cctgcccagc 120

ccttctagac tgcctggccc cagcgacacc cccatcctgc ctcagagcag cagcagcaag 180

gccccaccac catccctgcc tagccccagc agactgccag gcccttccga taccccaatc 240

ctgccccagg cccctcccag actgatctgc gacagccggg tgctggaaag atacctgctg 300

gaagccaaag aggccgagaa catcaccacc ggctgcgccg agcactgcag cctgaacgag 360

aatatcaccg tgcccgacac caaagtgaac ttctacgcct ggaagcggat ggaagtgggc 420

cagcaggccg tggaagtgtg gcagggactg gccctgctga gcgaggccgt gctgagagga 480

caggccctgc tggtgaacag cagccagccc tgggagcccc tgcagctgca tgtggataag 540

gccgtgtccg gcctgcggag cctgaccaca ctgctgagag ccctgggcgc tcagaaagag 600

gccatctctc cccctgatgc cgcctctgcc gcccctctga gaaccatcac cgccgacacc 660

ttccggaagc tgttccgggt gtacagcaac ttcctgcggg gcaagctgaa gctgtacacc 720

ggcgaggcct gccggaccgg cgatagaagc agctccagca aggctccacc ccccagcctg 780

ccatccccaa gtagactgcc cgggccctct gacacaccta tcctgccaca gtccagcagc 840

tccaaagctc ccccaccatc cctcccatcc ccatccagac tgcctggacc atccgacact 900

ccaattctgc ctcagtaagc ttggcgcgcc 930

<210> 70
<211> 295
<212> PRT
<213> Artificial

<220>
<223> APO-A1-CTP

<400> 70

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

Gln Ala Arg His Phe Trp Gln Gln Asp Glu Pro Pro Gln Ser Pro Trp
20 25 30

Asp Arg Val Lys Asp Leu Ala Thr Val Tyr Val Asp Val Leu Lys Asp
35 40 45

Ser Gly Arg Asp Tyr Val Ser Gln Phe Glu Gly Ser Ala Leu Gly Lys
50 55 60

```
Gln Leu Asn Leu Lys Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr
65                  70                  75                  80

Phe Ser Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp
                85                  90                  95

Asp Asn Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys
            100                 105                 110

Asp Leu Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe
        115                 120                 125

Gln Lys Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu
    130                 135                 140

Pro Leu Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu
145                 150                 155                 160

Leu Gln Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala
                165                 170                 175

Arg Ala His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp
            180                 185                 190

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

Gly Gly Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu
    210                 215                 220

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

Gly Leu Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala
                245                 250                 255

Leu Glu Glu Tyr Thr Lys Lys Leu Asn Thr Gln Ser Ser Ser Ser Lys
            260                 265                 270

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
        275                 280                 285

Asp Thr Pro Ile Leu Pro Gln
    290                 295
```

<210> 71
<211> 911
<212> DNA
<213> Artificial

<220>
<223> APO-A1-CTP

<400> 71
atgaaggccg ccgtgctgac cctggccgtg ctgtttctga ccggctctca ggcccggcac 60

ttctggcagc aggacgagcc tccccagtcc ccctgggaca gagtgaagga cctggccacc 120

gtgtacgtgg acgtgctgaa ggactccggc agagactacg tgtcccagtt cgagggctct 180

gccctgggca agcagctgaa cctgaagctg ctggacaact gggactccgt gacctccacc 240

ttctccaagc tgcgcgaaca gctgggacct gtgacccagg aattctggga caacctggaa 300

aaagagacag agggcctgag acaggaaatg tccaaggacc tggaagaggt caaagccaag 360

gtgcagccct acctggacga cttccagaag aaatggcagg aagagatgga actgtaccgg 420

cagaaggtgg aacccctgcg ggccgagctg caggaaggcg ctagacagaa gctgcacgaa 480

ctgcaggaaa agctgtcccc cctgggcgag gaaatgcggg acagagccag agcccacgtg 540

gacgccctga gaacccacct ggccccctac tctgacgagc tgcggcagag gctggccgcc 600

agactggaag ccctgaaaga gaacggcgga gcccggctgg ccgagtacca cgctaaggct 660

accgagcacc tgtccaccct gtccgagaag gccaagcccg ccctggaaga tctgcggcag 720

ggcctgctgc ccgtgctgga atccttcaag gtgtccttcc tgtccgctct ggaagagtac 780

accaagaagc tgaacaccca gtcctccagc tccaaggccc ctccaccctc cctgcctagc 840

cctagtagac tgcctgggcc ctccgacacc cccatcctgc cccagtgatg aggatccgcg 900

gccgcgagct c 911

<210> 72
<211> 323
<212> PRT
<213> Artificial

<220>
<223> APO-A1-CTP-CTP

<400> 72

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

Gln Ala Arg His Phe Trp Gln Gln Asp Glu Pro Pro Gln Ser Pro Trp
20 25 30

Asp Arg Val Lys Asp Leu Ala Thr Val Tyr Val Asp Val Leu Lys Asp
35 40 45

Ser Gly Arg Asp Tyr Val Ser Gln Phe Glu Gly Ser Ala Leu Gly Lys
50 55 60

Gln Leu Asn Leu Lys Leu Leu Asp Asn Trp Asp Ser Val Thr Ser Thr
65 70 75 80

Phe Ser Lys Leu Arg Glu Gln Leu Gly Pro Val Thr Gln Glu Phe Trp
85 90 95

```
Asp Asn Leu Glu Lys Glu Thr Glu Gly Leu Arg Gln Glu Met Ser Lys
            100                 105                 110

Asp Leu Glu Glu Val Lys Ala Lys Val Gln Pro Tyr Leu Asp Asp Phe
        115                 120                 125

Gln Lys Lys Trp Gln Glu Glu Met Glu Leu Tyr Arg Gln Lys Val Glu
    130                 135                 140

Pro Leu Arg Ala Glu Leu Gln Glu Gly Ala Arg Gln Lys Leu His Glu
145                 150                 155                 160

Leu Gln Glu Lys Leu Ser Pro Leu Gly Glu Glu Met Arg Asp Arg Ala
                165                 170                 175

Arg Ala His Val Asp Ala Leu Arg Thr His Leu Ala Pro Tyr Ser Asp
            180                 185                 190

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

Gly Gly Ala Arg Leu Ala Glu Tyr His Ala Lys Ala Thr Glu His Leu
    210                 215                 220

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

Gly Leu Leu Pro Val Leu Glu Ser Phe Lys Val Ser Phe Leu Ser Ala
                245                 250                 255

Leu Glu Glu Tyr Thr Lys Lys Leu Asn Thr Gln Ser Ser Ser Ser Lys
            260                 265                 270

Ala Pro Pro Pro Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser
        275                 280                 285

Asp Thr Pro Ile Leu Pro Gln Ser Ser Ser Ser Lys Ala Pro Pro Pro
    290                 295                 300

Ser Leu Pro Ser Pro Ser Arg Leu Pro Gly Pro Ser Asp Thr Pro Ile
305                 310                 315                 320

Leu Pro Gln
```

<210> 73
<211> 995
<212> DNA
<213> Artificial

<220>
<223> APO-A1-CTP-CTP

<400> 73

atgaaggccg ccgtgctgac cctggccgtg ctgtttctga ccggctctca ggcccggcac 60

ttctggcagc aggacgagcc tccccagtcc ccctgggaca gagtgaagga cctggccacc 120

gtgtacgtgg acgtgctgaa ggactccggc agagactacg tgtcccagtt cgagggctct 180

gccctgggca agcagctgaa cctgaagctg ctggacaact gggactccgt gacctccacc 240

ttctccaagc tgcgcgaaca gctgggacct gtgacccagg aattctggga caacctggaa 300

aaagagacag agggcctgag acaggaaatg tccaaggacc tggaagaggt caaagccaag 360

gtgcagccct acctggacga cttccagaag aaatggcagg aagagatgga actgtaccgg 420

cagaaggtgg aacccctgcg ggccgagctg caggaaggcg ctagacagaa gctgcacgaa 480

ctgcaggaaa agctgtcccc cctgggcgag gaaatgcggg acagagccag agcccacgtg 540

gacgccctga gaacccacct ggccccctac tctgacgagc tgcggcagag gctggccgcc 600

agactggaag ccctgaaaga gaacggcgga gcccggctgg ccgagtacca cgctaaggct 660

accgagcacc tgtccaccct gtccgagaag gccaagcccg ccctggaaga tctgcggcag 720

ggcctgctgc ccgtgctgga atccttcaag gtgtccttcc tgtccgctct ggaagagtac 780

accaagaagc tgaacaccca gtcctccagc tccaaggccc ctccaccctc cctgcctagc 840

cctagtagac tgcctgggcc ctccgacaca ccaatcctgc cacagagcag ctcctctaag 900

gcccctcctc catccctgcc atccccctcc cggctgcctg gcccctctga cacccctatc 960

ctgcctcagt gatgaaggtc tggatccgcg gccgc 995