SEQUENCE LISTING

<110> Juno Therapeutis, Inc.
Larson, Ryan P.

<120> PHENOTYPIC MARKERS FOR CELL THERAPY AND
RELATED METHODS

<130> 73504-20145.40

<140> Not Yet Assisgned
<141> Concurrently Herewith

<150> US 62/596,775
<151> 2017-12-08

<150> US 62/643,165
<151> 2018-03-14

<150> US 62/657,716
<151> 2018-04-13

<150> US 62/716,967
<151> 2018-08-09

<160> 59

<170> FastSEQ for Windows Version 4.0

<210> 1
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Spacer (IgG4hinge) (aa)

<400> 1
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro
1 5 10

<210> 2
<211> 36
<212> DNA
<213> Artificial Sequence

<220>
<223> Spacer (IgG4hinge) (nt)

<400> 2
gaatctaagt acggaccgcc ctgccccct tgccct 36

<210> 3
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge-CH3 spacer

<400> 3
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Gly Gln Pro Arg
 1   5   10   15
Glu Pro Gln Val Tyr Thr Leu Pro Pro Ser Gln Glu Glu Met Thr Lys
            20   25   30
Asn Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp
        35   40   45
Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys
    50   55   60
Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser
65   70   75   80
Arg Leu Thr Val Asp Lys Ser Arg Trp Gln Glu Gly Asn Val Phe Ser
                85   90   95
Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser
            100   105   110
Leu Ser Leu Ser Leu Gly Lys
        115

<210> 4
<211> 229
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge-CH2-CH3 spacer

<400> 4
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro Ala Pro Glu Phe
 1   5   10   15
Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr
            20   25   30
Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val
        35   40   45

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


<210> 5
<211> 282
<212> PRT
<213> Artificial Sequence

<220>
<223> IgD-hinge-Fc

<400> 5
Arg Trp Pro Glu Ser Pro Lys Ala Gln Ala Ser Ser Val Pro Thr Ala
 1               5                  10                  15
Gln Pro Gln Ala Glu Gly Ser Leu Ala Lys Ala Thr Thr Ala Pro Ala
            20                  25                  30
Thr Thr Arg Asn Thr Gly Arg Gly Gly Glu Glu Lys Lys Lys Glu Lys
        35                  40                  45
Glu Lys Glu Glu Gln Glu Glu Arg Glu Thr Lys Thr Pro Glu Cys Pro
    50                  55                  60
Ser His Thr Gln Pro Leu Gly Val Tyr Leu Leu Thr Pro Ala Val Gln
65                  70                  75                  80
Asp Leu Trp Leu Arg Asp Lys Ala Thr Phe Thr Cys Phe Val Val Gly
                85                  90                  95
Ser Asp Leu Lys Asp Ala His Leu Thr Trp Glu Val Ala Gly Lys Val
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```
            100                 105                 110
Pro Thr Gly Gly Val Glu Glu Gly Leu Leu Glu Arg His Ser Asn Gly
        115                 120                 125
Ser Gln Ser Gln His Ser Arg Leu Thr Leu Pro Arg Ser Leu Trp Asn
    130                 135                 140
Ala Gly Thr Ser Val Thr Cys Thr Leu Asn His Pro Ser Leu Pro Pro
145                 150                 155                 160
Gln Arg Leu Met Ala Leu Arg Glu Pro Ala Ala Gln Ala Pro Val Lys
                165                 170                 175
Leu Ser Leu Asn Leu Leu Ala Ser Ser Asp Pro Pro Glu Ala Ala Ser
            180                 185                 190
Trp Leu Leu Cys Glu Val Ser Gly Phe Ser Pro Pro Asn Ile Leu Leu
        195                 200                 205
Met Trp Leu Glu Asp Gln Arg Glu Val Asn Thr Ser Gly Phe Ala Pro
    210                 215                 220
Ala Arg Pro Pro Pro Gln Pro Gly Ser Thr Thr Phe Trp Ala Trp Ser
225                 230                 235                 240
Val Leu Arg Val Pro Ala Pro Pro Ser Pro Gln Pro Ala Thr Tyr Thr
                245                 250                 255
Cys Val Val Ser His Glu Asp Ser Arg Thr Leu Leu Asn Ala Ser Arg
            260                 265                 270
Ser Leu Glu Val Ser Tyr Val Thr Asp His
        275                 280
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<210> 6
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> T2A

<400> 6

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Leu Glu Gly Gly Gly Glu Gly Arg Gly Ser Leu Leu Thr Cys Gly Asp
 1               5                  10                  15
Val Glu Glu Asn Pro Gly Pro Arg
            20
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<210> 7
<211> 357
<212> PRT
<213> Artificial Sequence

<220>
<223> tEGFR

<400> 7

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Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
 1               5                  10                  15
Ala Phe Leu Leu Ile Pro Arg Lys Val Cys Asn Gly Ile Gly Ile Gly
            20                  25                  30
Glu Phe Lys Asp Ser Leu Ser Ile Asn Ala Thr Asn Ile Lys His Phe
        35                  40                  45
Lys Asn Cys Thr Ser Ile Ser Gly Asp Leu His Ile Leu Pro Val Ala
    50                  55                  60
Phe Arg Gly Asp Ser Phe Thr His Thr Pro Pro Leu Asp Pro Gln Glu
65                  70                  75                  80
Leu Asp Ile Leu Lys Thr Val Lys Glu Ile Thr Gly Phe Leu Leu Ile
                85                  90                  95
Gln Ala Trp Pro Glu Asn Arg Thr Asp Leu His Ala Phe Glu Asn Leu
            100                 105                 110
Glu Ile Ile Arg Gly Arg Thr Lys Gln His Gly Gln Phe Ser Leu Ala
        115                 120                 125
Val Val Ser Leu Asn Ile Thr Ser Leu Gly Leu Arg Ser Leu Lys Glu
    130                 135                 140
Ile Ser Asp Gly Asp Val Ile Ile Ser Gly Asn Lys Asn Leu Cys Tyr
145                 150                 155                 160
Ala Asn Thr Ile Asn Trp Lys Lys Leu Phe Gly Thr Ser Gly Gln Lys
                165                 170                 175
Thr Lys Ile Ile Ser Asn Arg Gly Glu Asn Ser Cys Lys Ala Thr Gly
            180                 185                 190
Gln Val Cys His Ala Leu Cys Ser Pro Glu Gly Cys Trp Gly Pro Glu
        195                 200                 205
Pro Arg Asp Cys Val Ser Cys Arg Asn Val Ser Arg Gly Arg Glu Cys
    210                 215                 220
Val Asp Lys Cys Asn Leu Leu Glu Gly Glu Pro Arg Glu Phe Val Glu
225                 230                 235                 240
Asn Ser Glu Cys Ile Gln Cys His Pro Glu Cys Leu Pro Gln Ala Met
                245                 250                 255
Asn Ile Thr Cys Thr Gly Arg Gly Pro Asp Asn Cys Ile Gln Cys Ala
            260                 265                 270
His Tyr Ile Asp Gly Pro His Cys Val Lys Thr Cys Pro Ala Gly Val
        275                 280                 285
Met Gly Glu Asn Asn Thr Leu Val Trp Lys Tyr Ala Asp Ala Gly His
    290                 295                 300
Val Cys His Leu Cys His Pro Asn Cys Thr Tyr Gly Cys Thr Gly Pro
305                 310                 315                 320
Gly Leu Glu Gly Cys Pro Thr Asn Gly Pro Lys Ile Pro Ser Ile Ala
                325                 330                 335
Thr Gly Met Val Gly Ala Leu Leu Leu Leu Leu Val Val Ala Leu Gly
            340                 345                 350
Ile Gly Leu Phe Met
        355
```

<210> 8
<211> 27
<212> PRT
<213> Homo sapiens

<220>
<223> CD28 (amino acids 153-179 of Accession No. P10747)

<400> 8
Phe Trp Val Leu Val Val Val Gly Gly Val Leu Ala Cys Tyr Ser Leu
 1   5   10   15
Leu Val Thr Val Ala Phe Ile Ile Phe Trp Val
            20   25

<210> 9
<211> 66
<212> PRT
<213> Homo sapiens

<220>
<223> CD28 (amino acids 114-179 of Accession No. P10747)

<400> 9
Ile Glu Val Met Tyr Pro Pro Pro Tyr Leu Asp Asn Glu Lys Ser Asn
 1   5   10   15
Gly Thr Ile Ile His Val Lys Gly Lys His Leu Cys Pro Ser Pro Leu
            20   25   30
Phe Pro Gly Pro Ser Lys Pro Phe Trp Val Leu Val Val Val Gly Gly
        35   40   45
Val Leu Ala Cys Tyr Ser Leu Leu Val Thr Val Ala Phe Ile Ile Phe
    50   55   60
Trp Val
65

<210> 10
<211> 41
<212> PRT
<213> Homo sapiens

<220>
<223> CD28 (amino acids 180-220 of P10747)

<400> 10
Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met Thr
 1   5   10   15

Pro Arg Arg Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala Pro
            20   25   30
Pro Arg Asp Phe Ala Ala Tyr Arg Ser
        35   40

<210> 11
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> CD28 (LL to GG)

<400> 11
Arg Ser Lys Arg Ser Arg Gly Gly His Ser Asp Tyr Met Asn Met Thr
 1   5   10   15
Pro Arg Arg Pro Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala Pro
            20   25   30
Pro Arg Asp Phe Ala Ala Tyr Arg Ser
        35   40

<210> 12
<211> 42
<212> PRT
<213> Homo sapiens

<220>
<223> 4-1BB (amino acids 214-255 of Q07011.1)

<400> 12
Lys Arg Gly Arg Lys Lys Leu Leu Tyr Ile Phe Lys Gln Pro Phe Met
 1   5   10   15
Arg Pro Val Gln Thr Thr Gln Glu Glu Asp Gly Cys Ser Cys Arg Phe
            20   25   30
Pro Glu Glu Glu Glu Gly Gly Cys Glu Leu
        35   40

<210> 13
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> CD3 zeta

<400> 13
Arg Val Lys Phe Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly
 1   5   10   15
Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr
            20   25   30
Asp Val Leu Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys
        35   40   45
Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys
    50   55   60
Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg
65   70   75   80
Arg Arg Gly Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala
                85   90   95
Thr Lys Asp Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
            100   105   110

<210> 14
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> CD3 zeta

<400> 14
Arg Val Lys Phe Ser Arg Ser Ala Glu Pro Pro Ala Tyr Gln Gln Gly
 1   5   10   15
Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr
            20   25   30
Asp Val Leu Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys
        35   40   45
Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys
    50   55   60
Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg
65   70   75   80
Arg Arg Gly Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala
                85   90   95
Thr Lys Asp Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
            100   105   110

<210> 15
<211> 112
<212> PRT
<213> Artificial Sequence

<220>

<223> CD3 zeta

<400> 15
Arg Val Lys Phe Ser Arg Ser Ala Asp Ala Pro Ala Tyr Lys Gln Gly
 1   5   10   15
Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr
            20   25   30
Asp Val Leu Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys
        35   40   45
Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys
    50   55   60
Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg
65   70   75   80
Arg Arg Gly Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala
                85   90   95
Thr Lys Asp Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
            100   105   110

<210> 16
<211> 335
<212> PRT
<213> Artificial Sequence

<220>
<223> tEGFR

<400> 16
Arg Lys Val Cys Asn Gly Ile Gly Ile Gly Glu Phe Lys Asp Ser Leu
 1   5   10   15
Ser Ile Asn Ala Thr Asn Ile Lys His Phe Lys Asn Cys Thr Ser Ile
            20   25   30
Ser Gly Asp Leu His Ile Leu Pro Val Ala Phe Arg Gly Asp Ser Phe
        35   40   45
Thr His Thr Pro Pro Leu Asp Pro Gln Glu Leu Asp Ile Leu Lys Thr
    50   55   60
Val Lys Glu Ile Thr Gly Phe Leu Leu Ile Gln Ala Trp Pro Glu Asn
65   70   75   80
Arg Thr Asp Leu His Ala Phe Glu Asn Leu Glu Ile Ile Arg Gly Arg
                85   90   95
Thr Lys Gln His Gly Gln Phe Ser Leu Ala Val Val Ser Leu Asn Ile
            100   105   110
Thr Ser Leu Gly Leu Arg Ser Leu Lys Glu Ile Ser Asp Gly Asp Val
        115   120   125
Ile Ile Ser Gly Asn Lys Asn Leu Cys Tyr Ala Asn Thr Ile Asn Trp
    130   135   140
Lys Lys Leu Phe Gly Thr Ser Gly Gln Lys Thr Lys Ile Ile Ser Asn
145   150   155   160

```
Arg Gly Glu Asn Ser Cys Lys Ala Thr Gly Gln Val Cys His Ala Leu
                165                 170                 175
Cys Ser Pro Glu Gly Cys Trp Gly Pro Glu Pro Arg Asp Cys Val Ser
            180                 185                 190
Cys Arg Asn Val Ser Arg Gly Arg Glu Cys Val Asp Lys Cys Asn Leu
        195                 200                 205
Leu Glu Gly Glu Pro Arg Glu Phe Val Glu Asn Ser Glu Cys Ile Gln
    210                 215                 220
Cys His Pro Glu Cys Leu Pro Gln Ala Met Asn Ile Thr Cys Thr Gly
225                 230                 235                 240
Arg Gly Pro Asp Asn Cys Ile Gln Cys Ala His Tyr Ile Asp Gly Pro
                245                 250                 255
His Cys Val Lys Thr Cys Pro Ala Gly Val Met Gly Glu Asn Asn Thr
            260                 265                 270
Leu Val Trp Lys Tyr Ala Asp Ala Gly His Val Cys His Leu Cys His
        275                 280                 285
Pro Asn Cys Thr Tyr Gly Cys Thr Gly Pro Gly Leu Glu Gly Cys Pro
    290                 295                 300
Thr Asn Gly Pro Lys Ile Pro Ser Ile Ala Thr Gly Met Val Gly Ala
305                 310                 315                 320
Leu Leu Leu Leu Leu Val Val Ala Leu Gly Ile Gly Leu Phe Met
                325                 330                 335
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<210> 17
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> T2A

<400> 17

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Glu Gly Arg Gly Ser Leu Leu Thr Cys Gly Asp Val Glu Glu Asn Pro
 1               5                  10                  15
Gly Pro
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<210> 18
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> P2A

<400> 18

Gly Ser Gly Ala Thr Asn Phe Ser Leu Leu Lys Gln Ala Gly Asp Val
 1   5   10   15
Glu Glu Asn Pro Gly Pro
            20

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

<220>
<223> P2A

<400> 19
Ala Thr Asn Phe Ser Leu Leu Lys Gln Ala Gly Asp Val Glu Glu Asn
 1   5   10   15
Pro Gly Pro

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

<220>
<223> E2A

<400> 20
Gln Cys Thr Asn Tyr Ala Leu Leu Lys Leu Ala Gly Asp Val Glu Ser
 1   5   10   15
Asn Pro Gly Pro
            20

<210> 21
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> F2A

<400> 21
Val Lys Gln Thr Leu Asn Phe Asp Leu Leu Lys Leu Ala Gly Asp Val
 1   5   10   15
Glu Ser Asn Pro Gly Pro

20

<210> 22
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<220>
<221> REPEAT
<222> (5)...(9)
<223> SGGGG is repeated 5 times

<400> 22
Pro Gly Gly Gly Ser Gly Gly Gly Gly Pro
 1   5   10

<210> 23
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 23
Gly Ser Ala Asp Asp Ala Lys Lys Asp Ala Ala Lys Lys Asp Gly Lys
 1   5   10   15
Ser

<210> 24
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> GMCSFR alpha chain signal sequence

<400> 24
atgcttctcc tggtgacaag ccttctgctc tgtgagttac cacacccagc attcctcctg 60
atccca   66

<210> 25
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> GMCSFR alpha chain signal sequence

<400> 25
Met Leu Leu Leu Val Thr Ser Leu Leu Leu Cys Glu Leu Pro His Pro
 1   5   10   15
Ala Phe Leu Leu Ile Pro
            20

<210> 26
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> CD8 alpha signal peptide

<400> 26
Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
 1   5   10   15
His Ala

<210> 27
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 27
Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys Pro
 1   5   10   15

<210> 28
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 28
Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro
 1   5   10

<210> 29
<211> 61
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 29
Glu Leu Lys Thr Pro Leu Gly Asp Thr His Thr Cys Pro Arg Cys Pro
 1   5   10   15
Glu Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro Glu
            20   25   30
Pro Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro Glu Pro
        35   40   45
Lys Ser Cys Asp Thr Pro Pro Pro Cys Pro Arg Cys Pro
    50   55   60

<210> 30
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 30
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Ser Cys Pro
 1   5   10

<210> 31
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 31
Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro
 1   5   10

<210> 32
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 32
Tyr Gly Pro Pro Cys Pro Pro Cys Pro
 1   5

<210> 33
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 33
Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro
 1   5   10

<210> 34
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<400> 34
Glu Val Val Val Lys Tyr Gly Pro Pro Cys Pro Pro Cys Pro
 1   5   10

<210> 35
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR L1

<400> 35
Arg Ala Ser Gln Asp Ile Ser Lys Tyr Leu Asn
 1   5   10

<210> 36
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR L2

<400> 36
Ser Arg Leu His Ser Gly Val
 1   5

<210> 37
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR L3

<400> 37
Gly Asn Thr Leu Pro Tyr Thr Phe Gly
 1   5

<210> 38
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR H1

<400> 38
Asp Tyr Gly Val Ser
 1   5

<210> 39
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR H2

<400> 39
Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser Ala Leu Lys Ser
 1   5   10   15

<210> 40
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR H3

<400> 40
Tyr Ala Met Asp Tyr Trp Gly
 1   5

<210> 41
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> VH

<400> 41
Glu Val Lys Leu Gln Glu Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
 1   5   10   15
Ser Leu Ser Val Thr Cys Thr Val Ser Gly Val Ser Leu Pro Asp Tyr
            20   25   30
Gly Val Ser Trp Ile Arg Gln Pro Pro Arg Lys Gly Leu Glu Trp Leu
        35   40   45
Gly Val Ile Trp Gly Ser Glu Thr Thr Tyr Tyr Asn Ser Ala Leu Lys
    50   55   60
Ser Arg Leu Thr Ile Ile Lys Asp Asn Ser Lys Ser Gln Val Phe Leu
65   70   75   80
Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala Ile Tyr Tyr Cys Ala
                85   90   95
Lys His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr Trp Gly Gln

100 105 110
Gly Thr Ser Val Thr Val Ser Ser
115 120

<210> 42
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> VL

<400> 42
Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15
Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Lys Tyr
20 25 30
Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys Leu Leu Ile
35 40 45
Tyr His Thr Ser Arg Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60
Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu Gln
65 70 75 80
Glu Asp Ile Ala Thr Tyr Phe Cys Gln Gln Gly Asn Thr Leu Pro Tyr
85 90 95
Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Thr
100 105

<210> 43
<211> 245
<212> PRT
<213> Artificial Sequence

<220>
<223> scFv

<400> 43
Asp Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15
Asp Arg Val Thr Ile Ser Cys Arg Ala Ser Gln Asp Ile Ser Lys Tyr
20 25 30
Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val Lys Leu Leu Ile
35 40 45
Tyr His Thr Ser Arg Leu His Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60
Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu Gln

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

<210> 44
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR L1

<400> 44
Lys Ala Ser Gln Asn Val Gly Thr Asn Val Ala
1 5 10

<210> 45
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR L2

<400> 45
Ser Ala Thr Tyr Arg Asn Ser

1 5

<210> 46
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR L3

<400> 46
Gln Gln Tyr Asn Arg Tyr Pro Tyr Thr
1 5

<210> 47
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR H1

<400> 47
Ser Tyr Trp Met Asn
1 5

<210> 48
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR H2

<400> 48
Gln Ile Tyr Pro Gly Asp Gly Asp Thr Asn Tyr Asn Gly Lys Phe Lys
1 5 10 15
Gly

<210> 49
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> CDR H3

<400> 49
Lys Thr Ile Ser Ser Val Val Asp Phe Tyr Phe Asp Tyr
 1   5   10

<210> 50
<211> 122
<212> PRT
<213> Artificial Sequence

<220>
<223> VH

<400> 50
Glu Val Lys Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ser
 1   5   10   15
Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ala Phe Ser Ser Tyr
            20   25   30
Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
        35   40   45
Gly Gln Ile Tyr Pro Gly Asp Gly Asp Thr Asn Tyr Asn Gly Lys Phe
    50   55   60
Lys Gly Gln Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr Ala Tyr
65   70   75   80
Met Gln Leu Ser Gly Leu Thr Ser Glu Asp Ser Ala Val Tyr Phe Cys
                85   90   95
Ala Arg Lys Thr Ile Ser Ser Val Val Asp Phe Tyr Phe Asp Tyr Trp
            100   105   110
Gly Gln Gly Thr Thr Val Thr Val Ser Ser
        115   120

<210> 51
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> VL

<400> 51
Asp Ile Glu Leu Thr Gln Ser Pro Lys Phe Met Ser Thr Ser Val Gly
 1   5   10   15
Asp Arg Val Ser Val Thr Cys Lys Ala Ser Gln Asn Val Gly Thr Asn

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            20                  25                  30
Val Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ser Pro Lys Pro Leu Ile
        35                  40                  45
Tyr Ser Ala Thr Tyr Arg Asn Ser Gly Val Pro Asp Arg Phe Thr Gly
    50                  55                  60
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Thr Asn Val Gln Ser
65                  70                  75                  80
Lys Asp Leu Ala Asp Tyr Phe Cys Gln Gln Tyr Asn Arg Tyr Pro Tyr
                85                  90                  95
Thr Ser Gly Gly Gly Thr Lys Leu Glu Ile Lys Arg
            100                 105


<210> 52
<211> 15
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 52
Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
 1               5                  10                  15


<210> 53
<211> 245
<212> PRT
<213> Artificial Sequence

<220>
<223> scFv

<400> 53
Glu Val Lys Leu Gln Gln Ser Gly Ala Glu Leu Val Arg Pro Gly Ser
 1               5                  10                  15
Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ala Phe Ser Ser Tyr
            20                  25                  30
Trp Met Asn Trp Val Lys Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45
Gly Gln Ile Tyr Pro Gly Asp Gly Asp Thr Asn Tyr Asn Gly Lys Phe
    50                  55                  60
Lys Gly Gln Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr Ala Tyr
65                  70                  75                  80
Met Gln Leu Ser Gly Leu Thr Ser Glu Asp Ser Ala Val Tyr Phe Cys
                85                  90                  95
Ala Arg Lys Thr Ile Ser Ser Val Val Asp Phe Tyr Phe Asp Tyr Trp
```

```
            100                 105                 110
Gly Gln Gly Thr Thr Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly
        115                 120                 125
Gly Gly Gly Ser Gly Gly Gly Gly Ser Asp Ile Glu Leu Thr Gln Ser
    130                 135                 140
Pro Lys Phe Met Ser Thr Ser Val Gly Asp Arg Val Ser Val Thr Cys
145                 150                 155                 160
Lys Ala Ser Gln Asn Val Gly Thr Asn Val Ala Trp Tyr Gln Gln Lys
                165                 170                 175
Pro Gly Gln Ser Pro Lys Pro Leu Ile Tyr Ser Ala Thr Tyr Arg Asn
            180                 185                 190
Ser Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe
        195                 200                 205
Thr Leu Thr Ile Thr Asn Val Gln Ser Lys Asp Leu Ala Asp Tyr Phe
    210                 215                 220
Cys Gln Gln Tyr Asn Arg Tyr Pro Tyr Thr Ser Gly Gly Gly Thr Lys
225                 230                 235                 240
Leu Glu Ile Lys Arg
                245
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<210> 54
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> HC-CDR3

<400> 54

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His Tyr Tyr Tyr Gly Gly Ser Tyr Ala Met Asp Tyr
 1               5                  10
```

<210> 55
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> LC-CDR2

<400> 55

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His Thr Ser Arg Leu His Ser
 1               5
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<210> 56

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

<220>
<223> LC-CDR3

<400> 56
Gln Gln Gly Asn Thr Leu Pro Tyr Thr
 1   5

<210> 57
<211> 735
<212> DNA
<213> Artificial Sequence

<220>
<223> Sequence encoding scFv

<400> 57
gacatccaga tgacccagac cacctccagc ctgagcgcca gcctgggcga ccgggtgacc 60
atcagctgcc gggccagcca ggacatcagc aagtacctga actggtatca gcagaagccc 120
gacggcaccg tcaagctgct gatctaccac accagccggc tgcacagcgg cgtgcccagc 180
cggtttagcg gcagcggctc cggcaccgac tacagcctga ccatctccaa cctggaacag 240
gaagatatcg ccacctactt ttgccagcag ggcaacacac tgccctacac ctttggcggc 300
ggaacaaagc tggaaatcac cggcagcacc tccggcagcg gcaagcctgg cagcggcgag 360
ggcagcacca agggcgaggt gaagctgcag gaaagcggcc ctggcctggt ggcccccagc 420
cagagcctga gcgtgacctg caccgtgagc ggcgtgagcc tgcccgacta cggcgtgagc 480
tggatccggc agccccccag gaagggcctg gaatggctgg gcgtgatctg gggcagcgag 540
accacctact acaacagcgc cctgaagagc cggctgacca tcatcaagga caacagcaag 600
agccaggtgt tcctgaagat gaacagcctg cagaccgacg acaccgccat ctactactgc 660
gccaagcact actactacgg cggcagctac gccatggact actggggcca gggcaccagc 720
gtgaccgtga gcagc   735

<210> 58
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Hinge

<220>
<221> VARIANT
<222> (1)...(1)
<223> Xaa is glycine, cysteine or arginine

<220>
<221> VARIANT
<222> (4)...(4)
<223> Xaa is cysteine or threonine

<400> 58
Xaa Pro Pro Xaa Pro
 1   5

<210> 59
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Linker

<400> 59
Gly Ser Thr Ser Gly Ser Gly Lys Pro Gly Ser Gly Glu Gly Ser Thr
 1   5   10   15
Lys Gly