SEQUENCE LISTING

<110> Singapore Health Services Pte. Ltd.

<120> Chimeric antigen receptors and modified cells comprising the same

<130> 53174317

<150> 10202104940X
<151> 2021-05-11

<160> 166

<170> PatentIn version 3.5

<210> 1
<211> 238
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a TNF-alpha scFv clone P3H2

<400> 1

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

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

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

Ser Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr Tyr Ala Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

```
Ala Lys Gly Gly Ala Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110


Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
        115                 120                 125


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


Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile
145                 150                 155                 160


Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
                165                 170                 175


Leu Leu Ile Tyr Ser Ala Ser Tyr Leu Gln Ser Gly Val Pro Ser Arg
            180                 185                 190


Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser
        195                 200                 205


Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala Asn Asn
    210                 215                 220


Ala Pro Thr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
225                 230                 235


<210>  2
<211>  714
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  An exemplary coding sequence for the TNF-alpha scFv clone P3H2

<400>  2
gaggtgcagc tgttggagtc tgggggaggc ttggtacagc ctgggggtc cctgagactc       60

tcctgtgcag cctctggatt cacctttagc agctatgcca tgagctgggt ccgccaggct      120

ccagggaagg ggctggagtg ggtctcaagt atttcttcta ctggtgcttc tacaacttac      180
```

gcagactccg tgaagggcag gttcaccatc tccagagaca attccaagaa cacgctgtat 240

ctgcaaatga acagcctgag agccgaggac acggccgtat attactgtgc gaaaggtggt 300

gctgcttttg actactgggg ccagggaacc ctggtcaccg tcagcagcgg tggaggtggt 360

tctggtggag gaggttctgg tggcggtggt tctgacatcc agatgaccca gtctccatcc 420

tccctgtctg catctgtagg agacagagtc accatcactt gccgggcaag tcagagcatt 480

agcagctatt taaattggta tcagcagaaa ccagggaaag cccctaagct cctgatctat 540

agtgcatcct atttgcaaag tggggtccca tcaaggttca gtggcagtgg atctgggaca 600

gatttcactc tcaccatcag cagtctgcaa cctgaagatt ttgcaactta ctactgtcaa 660

caggctaata atgctcctac tacgttcggc caagggacca aggtggaaat caaa 714

<210> 3
<211> 246
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of an IFN-gamma scFv TII 6AE52

<400> 3

Glu Val Lys Leu Glu Gln Ser Gly Thr Val Leu Ala Arg Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
20 25 30

Trp Met His Trp Ile Arg Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Ala Ile Tyr Pro Gly Ile Ser Asp Thr Ser Tyr Asn Gln Lys Phe
50 55 60

Lys Val Lys Ala Lys Leu Thr Ala Val Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

```
Met Glu Leu Ser Ser Leu Thr Asn Glu Asp Ser Ala Val Tyr Tyr Cys
                85                  90                  95

Thr Arg Asp Glu Asp Phe Asp Gly Phe Ala Tyr Trp Gly Gln Gly Thr
            100                 105                 110

Leu Val Thr Val Ser Ala Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser
        115                 120                 125

Gly Gly Gly Gly Ser Asp Val Leu Met Thr Gln Thr Pro Leu Ser Leu
    130                 135                 140

Pro Val Ser Leu Gly Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln
145                 150                 155                 160

Ser Ile Val His Ser Asn Gly Asn Thr Tyr Leu Asp Trp Tyr Leu Gln
                165                 170                 175

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

Phe Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
        195                 200                 205

Phe Thr Leu Arg Ile Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr
    210                 215                 220

Tyr Cys Phe Arg Gly Ser His Ala Pro Tyr Thr Phe Gly Gly Gly Thr
225                 230                 235                 240

Lys Leu Glu Ile Lys Arg
                245
```

<210> 4
<211> 738
<212> DNA
<213> Artificial Sequence

<220>

<223> An exemplary coding sequence for the IFN-gamma scFv TII 6AE52

<400> 4
gaggtcaagc tggagcagtc tgggactgtg ctggcaaggc ctggggcttc agtgaagatg 60

tcctgcaagg cttctggcta cacctttacc aactactgga tgcattggat aagacagagg 120

cctggacagg gtctggaatg gattggcgct atttatcctg gaattagtga tactagttac 180

aaccagaagt tcaaggtcaa ggccaaactg actgcagtca catccaccag cactgcctac 240

atggagctca gcagcctgac aaatgaggac tctgcggtct attattgtac aagagatgag 300

gatttcgacg gctttgctta ctggggccaa gggactctgg tcactgtctc tgcaggtggt 360

ggtgggtctg gcggaggtgg tagtggaggt ggtgggtctg atgttttgat gacccaaact 420

ccactctccc tgcctgtcag tcttggagat caagcctcca tctcttgcag atctagtcag 480

agtattgtac atagtaatgg aaacacctat ttagactggt acctgcagaa accaggccag 540

tctccaaagc tcctgatcta caaagtttcc aaccgatttt ctggggtccc agacaggttc 600

agtggcagtg gatcagggac agatttcaca ctcaggatca gcagagtgga ggctgaggat 660

ctgggagttt attactgctt tcgaggatca catgctccgt acacgttcgg agggggggacc 720

aagctggaaa taaaacgg 738

<210> 5
<211> 243
<212> PRT
<213> Artificial Sequence

<220>
<223> Amino acid sequence of IFN-gamma scFv TII 2G1G7

<400> 5

Gln Val Lys Leu Glu Gln Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1 5 10 15

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

Gly Val His Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Leu
35 40 45

```
Gly Val Ile Trp Ala Gly Gly Ser Thr Asn Tyr Asn Ser Ala Leu Met
    50                  55                  60

Ser Arg Leu Ser Ile Ser 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 Met Tyr Tyr Cys Ala
                85                  90                  95

Arg Arg Asp Gly Asn Arg Tyr Tyr Thr Met Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Ala Ser Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
        115                 120                 125

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

Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala Ser
145                 150                 155                 160

Ser Ser Val Ser Ser Ser Tyr Leu His Trp Tyr Gln Gln Lys Ser Gly
                165                 170                 175

Gly Ser Pro Lys Leu Trp Ile Tyr Arg Thr Ser Asn Leu Ala Ser Gly
            180                 185                 190

Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu
        195                 200                 205

Thr Ile Ser Ser Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
    210                 215                 220

Gln Tyr Ser Gly Tyr Pro Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu
225                 230                 235                 240
```

Leu Lys Arg

<210> 6
<211> 729
<212> DNA
<213> Artificial Sequence

<220>
<223> An exemplary coding sequence for the IFN-gamma scFv TII 2G1G7

<400> 6
caagttaagc tggagcagtc aggacctggc ctggtggcgc cctcacagag cctgtccatc 60

acttgcactg tctctgggtt ttcattaacc agctatggtg tacactgggt tcgccagtct 120

ccaggaaagg gtctggagtg gctgggagta atatgggctg gtggaagcac aaattataat 180

tcggctctca tgtccagact gagcatcagt aaagacaact ccaagagcca agttttctta 240

aaaatgaaca gtctgcaaac tgatgacaca gccatgtact actgtgccag aagagatggt 300

aacaggtact atactatgga ctactggggt caaggagctt cagtcaccgt ctcctcaggt 360

ggtggtgggt ctggcggagg tggtagtgga ggtggtgggt ctgaaaatgt gctcacccag 420

tctccagcaa tcatgtctgc atctccaggg gaaaaggtca ccatgacctg cagggccagc 480

tcaagtgtaa gttccagtta cttgcactgg taccagcaga agtcaggtgg ctcccccaaa 540

ctctggattt atagaacatc caacttggct tctggagtcc ctgctcgctt cagtggcagt 600

gggtctggga cctcttactc tctcacaatc agcagtgtgg aggctgaaga tgctgccact 660

tattactgcc agcagtacag tggttacccg ctcacgttcg gtgctgggac caagctggag 720

ctgaaacgg 729

<210> 7
<211> 39
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a CD28 hinge

<400> 7

```
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
        35
```

<210> 8
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of an intracellular signalling domain of CD3 zeta

<400> 8

```
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> 9
<211> 41
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of the co-stimulatory intracellular signalling domain of CD28

<400> 9

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

Pro Arg Arg Leu 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> 10
<211> 27
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a CD28 transmembrane domain

<400> 10

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> 11
<211> 1380
<212> DNA
<213> Artificial Sequence

<220>
<223> Exemplary coding sequence of a CAR comprising IFN-gamma scFv TII 2G1G7, a IgG4 hinge region, a CD28 transmembrane domain, a CD28

co-stimulatory domain, and a CD3 zeta signalling domain

<400> 11

atggctttgc ctgtgactgc actgttgctt cccttggctc tgcttctcca tgctgctaga 60

ccgcaagtta agctggagca gtcaggacct ggcctggtgg cgccctcaca gagcctgtcc 120

atcacttgca ctgtctctgg gttttcatta accagctatg gtgtacactg ggttcgccag 180

tctccaggaa agggtctgga gtggctggga gtaatatggg ctggtggaag cacaaattat 240

aattcggctc tcatgtccag actgagcatc agtaaagaca actccaagag ccaagttttc 300

ttaaaaatga acagtctgca aactgatgac acagccatgt actactgtgc cagaagagat 360

ggtaacaggt actatactat ggactactgg ggtcaaggag cttcagtcac cgtctcctca 420

ggtggtggtg ggtctggcgg aggtggtagt ggaggtggtg ggtctgaaaa tgtgctcacc 480

cagtctccag caatcatgtc tgcatctcca ggggaaaagg tcaccatgac ctgcagggcc 540

agctcaagtg taagttccag ttacttgcac tggtaccagc agaagtcagg tggctccccc 600

aaactctgga tttatagaac atccaacttg gcttctggag tccctgctcg cttcagtggc 660

agtgggtctg ggacctctta ctctctcaca atcagcagtg tggaggctga agatgctgcc 720

acttattact gccagcagta cagtggttac ccgctcacgt tcggtgctgg gaccaagctg 780

gagctgaaac gggctagcgc agaaagcaag tatggtcctc cctgcccccc gtgcccattt 840

tgggtgctgg tggtggttgg gggagtcctg gcttgctata gcttgctagt aacagtggcc 900

tttattattt tctgggtgag gagtaagagg agcaggctcc tgcacagtga ctacatgaac 960

atgactccaa gacgcctagg tcccactcgc aagcattacc agccctatgc cccaccacgc 1020

gacttcgcag cctatcgctc cagagtgaag ttcagcagga gcgcagacgc tccagcttac 1080

cagcagggcc agaaccagct ctataacgag ctcaatctag gacgaagaga ggagtacgat 1140

gttttggaca agagacgtgg ccgggaccct gagatggggg gaaagccgag aaggaagaac 1200

cctcaggaag gcctgtacaa tgaactgcag aaagataaga tggcggaggc ctacagtgag 1260

attgggatga aaggcgagcg ccggaggggc aaggggcacg atggccttta ccagggtctc 1320

agtacagcca ccaaggacac ctacgacgcc cttcacatgc aggccctgcc ccctcgctaa 1380

<210> 12
<211> 481
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of CAR PMC882 comprising the TNF alpha scFv, a CD28 hinge, a CD28 transmembrane domain, a CD28 co-stimulatory domain, and a CD3 zeta signalling domain (with leader sequence)

<400> 12

```
Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1               5                  10                  15


His Ala Ala Arg Pro Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu
            20                  25                  30


Val Gln Pro Gly Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe
        35                  40                  45


Thr Phe Ser Ser Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys
    50                  55                  60


Gly Leu Glu Trp Val Ser Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr
65                  70                  75                  80


Tyr Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser
                85                  90                  95


Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr
            100                 105                 110


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


Gln Gly Thr Leu Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly
    130                 135                 140


Gly Gly Ser Gly Gly Gly Gly Ser Asp Ile Gln Met Thr Gln Ser Pro
```

```
145                 150                 155                 160

Ser Ser Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg
                165                 170                 175

Ala Ser Gln Ser Ile Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro
            180                 185                 190

Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ser Ala Ser Tyr Leu Gln Ser
        195                 200                 205

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
    210                 215                 220

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys
225                 230                 235                 240

Gln Gln Ala Asn Asn Ala Pro Thr Thr Phe Gly Gln Gly Thr Lys Val
                245                 250                 255

Glu Ile Lys Ala Ser Ala Ile Glu Val Met Tyr Pro Pro Pro Tyr Leu
            260                 265                 270

Asp Asn Glu Lys Ser Asn Gly Thr Ile Ile His Val Lys Gly Lys His
        275                 280                 285

Leu Cys Pro Ser Pro Leu Phe Pro Gly Pro Ser Lys Pro Phe Trp Val
    290                 295                 300

Leu Val Val Val Gly Gly Val Leu Ala Cys Tyr Ser Leu Leu Val Thr
305                 310                 315                 320

Val Ala Phe Ile Ile Phe Trp Val Arg Ser Lys Arg Ser Arg Leu Leu
                325                 330                 335

His Ser Asp Tyr Met Asn Met Thr Pro Arg Arg Leu Gly Pro Thr Arg
            340                 345                 350
```

```
Lys His Tyr Gln Pro Tyr Ala Pro Pro Arg Asp Phe Ala Ala Tyr Arg
        355                 360                 365

Ser Arg Val Lys Phe Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln
    370                 375                 380

Gly Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu
385                 390                 395                 400

Tyr Asp Val Leu Asp Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly
                405                 410                 415

Lys Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln
            420                 425                 430

Lys Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu
        435                 440                 445

Arg Arg Arg Gly Lys Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr
    450                 455                 460

Ala Thr Lys Asp Thr Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro
465                 470                 475                 480

Arg
```

<210> 13
<211> 1958
<212> DNA
<213> Artificial Sequence

<220>
<223> Exemplary coding sequence of an NFAT-inducible expression cassette, encoding a 6(NFAT) minimal IL-2 promoter, a TGF-beta gene, a T2A peptide separating the TGF-beta and IL-10, and an IL-10 gene

<400> 13
ggaggaaaaa ctgtttcata cagaaggcgt ggaggaaaaa ctgtttcata cagaaggcgt 60

ggaggaaaaa ctgtttcata cagaaggcgt ggaggaaaaa ctgtttcata cagaaggcgt 120

ggaggaaaaa ctgtttcata cagaaggcgt ggaggaaaaa ctgtttcata cagaaggcgt 180

cagaattaac agtataaatt gcatctcttg ttcaagagtt ccctatcact cgagcggtcg 240

ccaccatgcc accttctgga ctgcggttgc ttccgttgct gttgccactg ctttggctgc 300

ttgttctgac acctggcaga cccgcagccg gtttgtcaac atgcaaaacg atcgacatgg 360

agctggtaaa gcgcaagcgc attgaggcaa tcagagggca gatcttgagc aagcttcggc 420

tcgcctctcc tccaagccag ggcgaggtgc cacccggtcc gctgccggaa gcggttctcg 480

ctctctataa cagcactaga gatagggtcg caggtgagtc tgctgaacct gaacctgaac 540

cggaagctga ctattacgct aaagaggtga cgagagttct catggtggaa actcacaatg 600

agatttatga taaatttaaa cagtctaccc acagcattta tatgtttttt aacaccagtg 660

agctccgcga ggctgtccct gaacctgtcc tcctttccag ggcagaattg cggcttctga 720

ggctgaagct taaagtagag caacacgtgg agctctacca gaaatatagt aataacagct 780

ggagatatct gtcaaaccga ctgctggcgc cctccgacag tccagagtgg ctttcctttg 840

acgttactgg cgtggtgcgg caatggcttt caagaggcgg ggaaatcgag ggcttcaggc 900

ttagcgctca ctgctcatgt gatagtaggg ataacacact tcaggtagac attaatgggt 960

tcacgacagg aagaagagga gatctggcta cgattcatgg catgaatagg cctttcctcc 1020

tgcttatggc tacgccattg gagcgcgcgc aacatctcca gtccagccgc cacagacgag 1080

ctctggatac taactactgc ttctccagca ctgagaagaa ctgctgcgta agacagcttt 1140

acatcgactt ccgcaaggac ctgggttgga agtggataca cgagcccaag ggatatcatg 1200

ccaacttctg cctcgggccc tgtccctaca tctggtcatt ggatacacag tacagcaagg 1260

tactcgctct gtacaaccag cacaaccctg gtgcaagcgc agctccctgc tgtgttcccc 1320

aggctctgga accattgcct attgtttatt atgtaggacg aaaaccgaag gtcgagcagc 1380

tcagtaacat gatcgttcgg agctgcaagt gctctggctc aggcgagggc agaggcagcc 1440

tgctgacatg tggcgacgtg gaagagaacc ccgggcctag tccaggtcaa ggtacacaga 1500

gtgagaacag ttgcacacac tttcccggca acttgcctaa tatgctgagg gacctccggg 1560

atgctttctc tcgggtaaaa actttttttc aaatgaaaga ccaactcgat aacctccttc 1620

tgaaggagag cctcctggag gacttcaagg gatatttggg gtgccaagct ttgtccgaga 1680

tgattcagtt ctacttggaa gaggtgatgc cacaagcgga gaaccaagac ccggacatca 1740

aggctcacgt caatagcttg ggagaaaacc tgaagaccct gcggttgagg ctgcgccgct 1800

gtcataggtt ccttccatgt gagaacaaat ccaaagctgt ggaacaggtc aaaaatgctt 1860

tcaacaaact gcaggagaaa ggtatatata aggccatgtc tgaatttgac atatttatca 1920

actacataga ggcgtatatg accatgaaga ttcgcaat 1958

<210> 14
<211> 4902
<212> DNA
<213> Artificial Sequence

<220>
<223> Full coding sequence of the CAR construct comprising the TNF-alpha scFv, IgG4 hinge, CD28 transmembrane domain, CD28 co-stimulatory domain, CD3 zeta signalling domain with a T2A skip peptide to FOXP3 in the same cassette and a NFAT inducible

<400> 14
atggctttgc ctgtgactgc actgttgctt cccttggctc tgcttctcca tgctgctaga 60

ccggactata aagatgacga tgataagggc gggtccgagg tgcagctggt ggagtctggg 120

ggaggcttgg tacagcccgg caggtccctg agactctcct gtgcggcctc tggattcacc 180

tttgatgatt atgccatgca ctgggtccgg caagctccag ggaagggcct ggaatgggtc 240

tcagctatca cttggaatag tggtcacata gactatgcgg actctgtgga gggccgattc 300

accatctcca gagacaacgc caagaactcc ctgtatctgc aaatgaacag tctgagagct 360

gaggatacgg ccgtatatta ctgtgcgaaa gtctcgtacc ttagcaccgc gtcctccctt 420

gactattggg gccaaggtac cctggtcacc gtctcgagtg gtggtggtgg gtctggcgga 480

ggtggtagtg gaggtggtgg gtctgacatc cagatgaccc agtctccatc ctccctgtct 540

gcatctgtag gggacagagt caccatcact tgtcgggcaa gtcagggcat cagaaattac 600

ttagcctggt atcagcaaaa accagggaaa gcccctaagc tcctgatcta tgctgcatcc 660

actttgcaat caggggtccc atctcggttc agtggcagtg gatctgggac agatttcact 720

ctcaccatca gcagcctaca gcctgaagat gttgcaactt attactgtca aaggtataac 780

cgtgcaccgt atacttttgg ccagggcacc aaggtggaaa tcaaagctag cgcagaaagc 840

aagtatggtc ctccctgccc cccgtgccca ttttgggtgc tggtggtggt tgggggagtc 900

ctggcttgct atagcttgct agtaacagtg gcctttatta ttttctgggt gaggagtaag 960

aggagcaggc tcctgcacag tgactacatg aacatgactc caagacgcct aggtcccact 1020

cgcaagcatt accagcccta tgccccacca cgcgacttcg cagcctatcg ctccagagtg 1080

aagttcagca ggagcgcaga cgctccagct taccagcagg gccagaacca gctctataac 1140

gagctcaatc taggacgaag agaggagtac gatgttttgg acaagagacg tggccgggac 1200

cctgagatgg ggggaaagcc gagaaggaag aaccctcagg aaggcctgta caatgaactg 1260

cagaaagata agatggcgga ggcctacagt gagattggga tgaaaggcga gcgccggagg 1320

ggcaaggggc acgatggcct ttaccagggt ctcagtacag ccaccaagga cacctacgac 1380

gcccttcaca tgcaggccct gcccccctcgc ggctcaggcg agggcagagg cagcctgctg 1440

acatgtggcg acgtggaaga gaaccccggg cctatgccta atcctcggcc tggaaagcct 1500

agcgctcctt ctcttgctct gggaccttct cctggcgcct ctccatcttg gagagccgct 1560

cctaaagcca gcgatctgct gggagctaga ggacctggcg gcacatttca gggcagagat 1620

cttagaggcg gagcccacgc tagctcctcc agccttaatc ctatgcctcc tagccagctc 1680

cagctgccta cactgcctct ggttatggtg gctcctagcg gagctagact gggccctctg 1740

cctcatctgc aagctctgct gcaggacaga ccccacttca tgcaccagct gagcaccgtg 1800

gatgcccacg caagaacacc tgtgctgcag gttcaccctc tggaatcccc agccatgatc 1860

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cctcctggca tcaatgtggc cagcctggaa tgggtgtcca gagaacctgc tctgctgtgc 1980

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<210> 15
<211> 4815
<212> DNA
<213> Artificial Sequence

<220>

<223> Full sequence of a CAR construct comprising of IFN-gamma scFv TII 2G1G7, an IgG4 hinge, CD28 transmembrane domain, CD28 co-stimulatory domain, CD3 zeta signalling domain with a T2A skip peptide to FOXP3 in the same cassette and a NFAT inducible

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<210> 16
<211> 160
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of IL-10

<400> 16

Ser Pro Gly Gln Gly Thr Gln Ser Glu Asn Ser Cys Thr His Phe Pro
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Gly Asn Leu Pro Asn Met Leu Arg Asp Leu Arg Asp Ala Phe Ser Arg
20 25 30

Val Lys Thr Phe Phe Gln Met Lys Asp Gln Leu Asp Asn Leu Leu Leu
35 40 45

Lys Glu Ser Leu Leu Glu Asp Phe Lys Gly Tyr Leu Gly Cys Gln Ala
50 55 60

Leu Ser Glu Met Ile Gln Phe Tyr Leu Glu Glu Val Met Pro Gln Ala
65 70 75 80

```
Glu Asn Gln Asp Pro Asp Ile Lys Ala His Val Asn Ser Leu Gly Glu
                85                  90                  95

Asn Leu Lys Thr Leu Arg Leu Arg Leu Arg Arg Cys His Arg Phe Leu
            100                 105                 110

Pro Cys Glu Asn Lys Ser Lys Ala Val Glu Gln Val Lys Asn Ala Phe
        115                 120                 125

Asn Lys Leu Gln Glu Lys Gly Ile Tyr Lys Ala Met Ser Glu Phe Asp
    130                 135                 140

Ile Phe Ile Asn Tyr Ile Glu Ala Tyr Met Thr Met Lys Ile Arg Asn
145                 150                 155                 160
```

<210> 17
<211> 389
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of TGF-beta

<400> 17

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Pro Pro Ser Gly Leu Arg Leu Leu Pro Leu Leu Leu Pro Leu Leu Trp
1               5                   10                  15

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

Lys Thr Ile Asp Met Glu Leu Val Lys Arg Lys Arg Ile Glu Ala Ile
        35                  40                  45

Arg Gly Gln Ile Leu Ser Lys Leu Arg Leu Ala Ser Pro Pro Ser Gln
    50                  55                  60

Gly Glu Val Pro Pro Gly Pro Leu Pro Glu Ala Val Leu Ala Leu Tyr
65                  70                  75                  80
```

```
Asn Ser Thr Arg Asp Arg Val Ala Gly Glu Ser Ala Glu Pro Glu Pro
                85                  90                  95

Glu Pro Glu Ala Asp Tyr Tyr Ala Lys Glu Val Thr Arg Val Leu Met
            100                 105                 110

Val Glu Thr His Asn Glu Ile Tyr Asp Lys Phe Lys Gln Ser Thr His
        115                 120                 125

Ser Ile Tyr Met Phe Phe Asn Thr Ser Glu Leu Arg Glu Ala Val Pro
    130                 135                 140

Glu Pro Val Leu Leu Ser Arg Ala Glu Leu Arg Leu Leu Arg Leu Lys
145                 150                 155                 160

Leu Lys Val Glu Gln His Val Glu Leu Tyr Gln Lys Tyr Ser Asn Asn
                165                 170                 175

Ser Trp Arg Tyr Leu Ser Asn Arg Leu Leu Ala Pro Ser Asp Ser Pro
            180                 185                 190

Glu Trp Leu Ser Phe Asp Val Thr Gly Val Val Arg Gln Trp Leu Ser
        195                 200                 205

Arg Gly Gly Glu Ile Glu Gly Phe Arg Leu Ser Ala His Cys Ser Cys
    210                 215                 220

Asp Ser Arg Asp Asn Thr Leu Gln Val Asp Ile Asn Gly Phe Thr Thr
225                 230                 235                 240

Gly Arg Arg Gly Asp Leu Ala Thr Ile His Gly Met Asn Arg Pro Phe
                245                 250                 255

Leu Leu Leu Met Ala Thr Pro Leu Glu Arg Ala Gln His Leu Gln Ser
            260                 265                 270

Ser Arg His Arg Arg Ala Leu Asp Thr Asn Tyr Cys Phe Ser Ser Thr
        275                 280                 285
```

```
Glu Lys Asn Cys Cys Val Arg Gln Leu Tyr Ile Asp Phe Arg Lys Asp
    290                 295                 300

Leu Gly Trp Lys Trp Ile His Glu Pro Lys Gly Tyr His Ala Asn Phe
305                 310                 315                 320

Cys Leu Gly Pro Cys Pro Tyr Ile Trp Ser Leu Asp Thr Gln Tyr Ser
                325                 330                 335

Lys Val Leu Ala Leu Tyr Asn Gln His Asn Pro Gly Ala Ser Ala Ala
            340                 345                 350

Pro Cys Cys Val Pro Gln Ala Leu Glu Pro Leu Pro Ile Val Tyr Tyr
        355                 360                 365

Val Gly Arg Lys Pro Lys Val Glu Gln Leu Ser Asn Met Ile Val Arg
    370                 375                 380

Ser Cys Lys Cys Ser
385
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<210> 18
<211> 431
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of FOXP3

<400> 18

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Met Pro Asn Pro Arg Pro Gly Lys Pro Ser Ala Pro Ser Leu Ala Leu
1               5                   10                  15

Gly Pro Ser Pro Gly Ala Ser Pro Ser Trp Arg Ala Ala Pro Lys Ala
            20                  25                  30

Ser Asp Leu Leu Gly Ala Arg Gly Pro Gly Gly Thr Phe Gln Gly Arg
        35                  40                  45
```

```
Asp Leu Arg Gly Gly Ala His Ala Ser Ser Ser Ser Leu Asn Pro Met
    50                  55                  60

Pro Pro Ser Gln Leu Gln Leu Pro Thr Leu Pro Leu Val Met Val Ala
65                  70                  75                  80

Pro Ser Gly Ala Arg Leu Gly Pro Leu Pro His Leu Gln Ala Leu Leu
                85                  90                  95

Gln Asp Arg Pro His Phe Met His Gln Leu Ser Thr Val Asp Ala His
            100                 105                 110

Ala Arg Thr Pro Val Leu Gln Val His Pro Leu Glu Ser Pro Ala Met
        115                 120                 125

Ile Ser Leu Thr Pro Pro Thr Thr Ala Thr Gly Val Phe Ser Leu Lys
    130                 135                 140

Ala Arg Pro Gly Leu Pro Pro Gly Ile Asn Val Ala Ser Leu Glu Trp
145                 150                 155                 160

Val Ser Arg Glu Pro Ala Leu Leu Cys Thr Phe Pro Asn Pro Ser Ala
                165                 170                 175

Pro Arg Lys Asp Ser Thr Leu Ser Ala Val Pro Gln Ser Ser Tyr Pro
            180                 185                 190

Leu Leu Ala Asn Gly Val Cys Lys Trp Pro Gly Cys Glu Lys Val Phe
        195                 200                 205

Glu Glu Pro Glu Asp Phe Leu Lys His Cys Gln Ala Asp His Leu Leu
    210                 215                 220

Asp Glu Lys Gly Arg Ala Gln Cys Leu Leu Gln Arg Glu Met Val Gln
225                 230                 235                 240
```

```
Ser Leu Glu Gln Gln Leu Val Leu Glu Lys Glu Lys Leu Ser Ala Met
                245                 250                 255

Gln Ala His Leu Ala Gly Lys Met Ala Leu Thr Lys Ala Ser Ser Val
            260                 265                 270

Ala Ser Ser Asp Lys Gly Ser Cys Cys Ile Val Ala Ala Gly Ser Gln
        275                 280                 285

Gly Pro Val Val Pro Ala Trp Ser Gly Pro Arg Glu Ala Pro Asp Ser
    290                 295                 300

Leu Phe Ala Val Arg Arg His Leu Trp Gly Ser His Gly Asn Ser Thr
305                 310                 315                 320

Phe Pro Glu Phe Leu His Asn Met Asp Tyr Phe Lys Phe His Asn Met
                325                 330                 335

Arg Pro Pro Phe Thr Tyr Ala Thr Leu Ile Arg Trp Ala Ile Leu Glu
            340                 345                 350

Ala Pro Glu Lys Gln Arg Thr Leu Asn Glu Ile Tyr His Trp Phe Thr
        355                 360                 365

Arg Met Phe Ala Phe Phe Arg Asn His Pro Ala Thr Trp Lys Asn Ala
    370                 375                 380

Ile Arg His Asn Leu Ser Leu His Lys Cys Phe Val Arg Val Glu Ser
385                 390                 395                 400

Glu Lys Gly Ala Val Trp Thr Val Asp Glu Leu Glu Phe Arg Lys Lys
                405                 410                 415

Arg Ser Gln Arg Pro Ser Arg Cys Ser Asn Pro Thr Pro Gly Pro
            420                 425                 430
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<210> 19
<211> 116

<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 VH

<400> 19

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
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Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Tyr
            20   25   30

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

Ser Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr Tyr Ala Asp Ser Val
    50   55   60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65   70   75   80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85   90   95

Ala Lys Gly Gly Ala Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100   105   110

Thr Val Ser Ser
        115

<210> 20
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 VL

<400> 20

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


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


Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45


Tyr Ser Ala Ser Tyr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60


Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala Asn Asn Ala Pro Thr
                85                  90                  95


Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
            100                 105


<210>  21
<211>  5
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<213>  Artificial Sequence

<220>
<223>  anti-TNF-alpha scFv clone P3H2 & Anti-IFNy NovImmune Clone A6 -
       Emapalumab - CDRH1 (Kabat)

<400>  21

Ser Tyr Ala Met Ser
1               5


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

<220>
<223>  anti-TNF-alpha scFv clone P3H2 & Anti-IFNy NovImmune Clone A6 -
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Emapalumab - CDRH1 (AbM)

<400> 22

Gly Phe Thr Phe Ser Ser Tyr Ala Met Ser
1 5 10

<210> 23
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 & Anti-IFNy NovImmune Clone A6 -
Emapalumab - CDRH1 (IMGT)

<400> 23

Gly Phe Thr Phe Ser Ser Tyr Ala
1 5

<210> 24
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRH2 (Kabat)

<400> 24

Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 25
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRH2 (AbM)

<400> 25

Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr
1   5   10

<210> 26
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRH2 (IMGT)

<400> 26

Ile Ser Ser Thr Gly Ala Ser Thr
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<210> 27
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<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRH3 (Kabat, AbM)

<400> 27

Gly Gly Ala Ala Phe Asp Tyr
1   5

<210> 28
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<212> PRT
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<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRH3 (IMGT)

<400> 28

Ala Lys Gly Gly Ala Ala Phe Asp Tyr
1   5

<210> 29
<211> 11
<212> PRT

<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRL1 (Kabat, AbM)

<400> 29

Arg Ala Ser Gln Ser Ile Ser Ser Tyr Leu Asn
1   5   10

<210> 30
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRL1 (IMGT)

<400> 30

Gln Ser Ile Ser Ser Tyr
1   5

<210> 31
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRL2 (Kabat, AbM)

<400> 31

Ser Ala Ser Tyr Leu Gln Ser
1   5

<210> 32
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFvclone P3H2 - CDRL2 (IMGT)

<400> 32

Ser Ala

1

<210> 33
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> anti-TNF-alpha scFv clone P3H2 - CDRL3 (Kabat, AbM, IMGT)

<400> 33

Gln Gln Ala Asn Asn Ala Pro Thr Thr
1 5

<210> 34
<211> 118
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 VH

<400> 34

Glu Val Lys Leu Glu Gln Ser Gly Thr Val Leu Ala Arg Pro Gly Ala
1 5 10 15

Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Asn Tyr
20 25 30

Trp Met His Trp Ile Arg Gln Arg Pro Gly Gln Gly Leu Glu Trp Ile
35 40 45

Gly Ala Ile Tyr Pro Gly Ile Ser Asp Thr Ser Tyr Asn Gln Lys Phe
50 55 60

Lys Val Lys Ala Lys Leu Thr Ala Val Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Thr Asn Glu Asp Ser Ala Val Tyr Tyr Cys
85 90 95

Thr Arg Asp Glu Asp Phe Asp Gly Phe Ala Tyr Trp Gly Gln Gly Thr
100 105 110

Leu Val Thr Val Ser Ala
115

<210> 35
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 VL

<400> 35

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

Asp Gln Ala Ser Ile Ser Cys Arg Ser Ser Gln Ser Ile Val His Ser
20 25 30

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

Pro Lys Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ser Gly Val Pro
50 55 60

Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Arg Ile
65 70 75 80

Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr Cys Phe Arg Gly
85 90 95

Ser His Ala Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105 110

Arg

<210> 36
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH1 (Kabat)

<400> 36

Asn Tyr Trp Met His
1   5

<210> 37
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH1 (AbM)

<400> 37

Gly Tyr Thr Phe Thr Asn Tyr Trp Met His
1   5   10

<210> 38
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH1 (IMGT)

<400> 38

Gly Tyr Thr Phe Thr Asn Tyr Trp
1   5

<210> 39
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH2 (Kabat)

<400> 39

Ala Ile Tyr Pro Gly Ile Ser Asp Thr Ser Tyr Asn Gln Lys Phe Lys
1 5 10 15

Val

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

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH2 (AbM)

<400> 40

Ala Ile Tyr Pro Gly Ile Ser Asp Thr Ser
1 5 10

<210> 41
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH2 (IMGT)

<400> 41

Ile Tyr Pro Gly Ile Ser Asp Thr
1 5

<210> 42
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH3 (Kabat, AbM)

<400> 42

Asp Glu Asp Phe Asp Gly Phe Ala Tyr

1 5

<210> 43
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRH3 (IMGT)

<400> 43

Thr Arg Asp Glu Asp Phe Asp Gly Phe Ala Tyr
1 5 10

<210> 44
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRL1 (Kabat, AbM)

<400> 44

Arg Ser Ser Gln Ser Ile Val His Ser Asn Gly Asn Thr Tyr Leu Asp
1 5 10 15

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

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRL1 (IMGT)

<400> 45

Gln Ser Ile Val His Ser Asn Gly Asn Thr Tyr
1 5 10

<210> 46
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRL2 (Kabat, AbM)

<400> 46

Lys Val Ser Asn Arg Phe Ser
1   5

<210> 47
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 & Anti-IL17A Clone Mab126 - Ixekizumab -
       CDRL2 (IMGT)

<400> 47

Lys Val
1

<210> 48
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 6AE52 - CDRL3 (Kabat, AbM, IMGT)

<400> 48

Phe Arg Gly Ser His Ala Pro Tyr Thr
1   5

<210> 49
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 VH

<400> 49

Gln Val Lys Leu Glu Gln Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1   5   10   15

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

Gly Val His Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Leu
        35                  40                  45

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

Ser Arg Leu Ser Ile Ser 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 Met Tyr Tyr Cys Ala
                85                  90                  95

Arg Arg Asp Gly Asn Arg Tyr Tyr Thr Met Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Ala Ser Val Thr Val Ser Ser
        115
```

<210> 50
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 VL

<400> 50

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

Glu Lys Val Thr Met Thr Cys Arg Ala Ser Ser Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu His Trp Tyr Gln Gln Lys Ser Gly Gly Ser Pro Lys Leu Trp
        35                  40                  45
```

```
Ile Tyr Arg Thr Ser Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser
    50                  55                  60


Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu Thr Ile Ser Ser Val Glu
65                  70                  75                  80


Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Gly Tyr Pro
                85                  90                  95


Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu Leu Lys Arg
            100                 105


<210>  51
<211>  5
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  IFN-gamma scFv TII 2G1G7 - CDRH1 (Kabat)

<400>  51

Ser Tyr Gly Val His
1               5


<210>  52
<211>  10
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  IFN-gamma scFv TII 2G1G7 - CDRH1 (AbM)

<400>  52

Gly Phe Ser Leu Thr Ser Tyr Gly Val His
1               5                   10


<210>  53
<211>  8
<212>  PRT
<213>  Artificial Sequence
```

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRH1 (IMGT)

<400> 53

Gly Phe Ser Leu Thr Ser Tyr Gly
1   5

<210> 54
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRH2 (Kabat)

<400> 54

Val Ile Trp Ala Gly Gly Ser Thr Asn Tyr Asn Ser Ala Leu Met Ser
1   5   10   15

<210> 55
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRH2 (AbM)

<400> 55

Val Ile Trp Ala Gly Gly Ser Thr Asn
1   5

<210> 56
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRH2 (IMGT)

<400> 56

Ile Trp Ala Gly Gly Ser Thr
1   5

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

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRH3 (Kabat, AbM)

<400> 57

Arg Asp Gly Asn Arg Tyr Tyr Thr Met Asp Tyr
1 5 10

<210> 58
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRH3 (IMGT)

<400> 58

Ala Arg Arg Asp Gly Asn Arg Tyr Tyr Thr Met Asp Tyr
1 5 10

<210> 59
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRL1 (Kabat, AbM)

<400> 59

Arg Ala Ser Ser Ser Val Ser Ser Ser Tyr Leu His
1 5 10

<210> 60
<211> 7
<212> PRT
<213> Artificial Sequence

<220>

<223> IFN-gamma scFv TII 2G1G7 - CDRL1 (IMGT)

<400> 60

Ser Ser Val Ser Ser Ser Tyr
1   5

<210> 61
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRL2 (Kabat, AbM)

<400> 61

Arg Thr Ser Asn Leu Ala Ser
1   5

<210> 62
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRL2 (IMGT)

<400> 62

Arg Thr
1

<210> 63
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> IFN-gamma scFv TII 2G1G7 - CDRL3 (Kabat, AbM, IMGT)

<400> 63

Gln Gln Tyr Ser Gly Tyr Pro Leu Thr
1   5

<210> 64
<211> 243
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of anti-TNFa scFv clone 2DE7

<400> 64

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15


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


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


Ser Ala Ile Thr Trp Asn Ser Gly His Ile Asp Tyr Ala Asp Ser Val
    50                  55                  60


Glu Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80


Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95


Ala Lys Val Ser Tyr Leu Ser Thr Ala Ser Ser Leu Asp Tyr Trp Gly
            100                 105                 110


Gln Gly Thr Leu Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly
        115                 120                 125


Gly Gly Ser Gly Gly Gly Gly Ser Asp Ile Gln Met Thr Gln Ser Pro
    130                 135                 140


Ser Ser Leu Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg
145                 150                 155                 160
```

```
Ala Ser Gln Gly Ile Arg Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro
                165                 170                 175

Gly Lys Ala Pro Lys Leu Leu Ile Tyr Ala Ala Ser Thr Leu Gln Ser
            180                 185                 190

Gly Val Pro Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
        195                 200                 205

Leu Thr Ile Ser Ser Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys
    210                 215                 220

Gln Arg Tyr Asn Arg Ala Pro Tyr Thr Phe Gly Gln Gly Thr Lys Val
225                 230                 235                 240

Glu Ile Lys
```

<210> 65
<211> 121
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 VH

<400> 65

```
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1               5                   10                  15

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

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

Ser Ala Ile Thr Trp Asn Ser Gly His Ile Asp Tyr Ala Asp Ser Val
    50                  55                  60
```

```
Glu Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80


Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95


Ala Lys Val Ser Tyr Leu Ser Thr Ala Ser Ser Leu Asp Tyr Trp Gly
            100                 105                 110


Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120
```

<210> 66
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 VL

<400> 66

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


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


Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45


Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
    50                  55                  60


Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65                  70                  75                  80


Glu Asp Val Ala Thr Tyr Tyr Cys Gln Arg Tyr Asn Arg Ala Pro Tyr
                85                  90                  95
```

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 67
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4-CDRH1 (Kabat)

<400> 67

Asp Tyr Ala Met His
1 5

<210> 68
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4-CDRH1 (AbM)

<400> 68

Gly Phe Thr Phe Asp Asp Tyr Ala Met His
1 5 10

<210> 69
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 - CDRH1 (IMGT)

<400> 69

Gly Phe Thr Phe Asp Asp Tyr Ala
1 5

<210> 70

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

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4-
CDRH2 (Kabat)

<400> 70

Ala Ile Thr Trp Asn Ser Gly His Ile Asp Tyr Ala Asp Ser Val Glu
1 5 10 15

Gly

<210> 71
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 -
CDRH2 (AbM)

<400> 71

Ala Ile Thr Trp Asn Ser Gly His Ile Asp
1 5 10

<210> 72
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 -
CDRH2 (IMGT)

<400> 72

Ile Thr Trp Asn Ser Gly His Ile
1 5

<210> 73
<211> 12

<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 - CDRH3 (Kabat, AbM)

<400> 73

Val Ser Tyr Leu Ser Thr Ala Ser Ser Leu Asp Tyr
1 5 10

<210> 74
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 - CDRH3 (IMGT)

<400> 74

Ala Lys Val Ser Tyr Leu Ser Thr Ala Ser Ser Leu Asp Tyr
1 5 10

<210> 75
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 -
CDRL1 (Kabat, AbM)

<400> 75

Arg Ala Ser Gln Gly Ile Arg Asn Tyr Leu Ala
1 5 10

<210> 76
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 -
CDRL1 (IMGT)

<400> 76

Gln Gly Ile Arg Asn Tyr
1 5

<210> 77
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 - CDRL2 (Kabat, AbM)

<400> 77

Ala Ala Ser Thr Leu Gln Ser
1 5

<210> 78
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 & Anti-TNFa scFv clone 2SD4 - CDRL2 (IMGT)

<400> 78

Ala Ala
1

<210> 79
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone Humira D2E7 - CDRL3 (Kabat, AbM, IMGT)

<400> 79

Gln Arg Tyr Asn Arg Ala Pro Tyr Thr
1 5

<210> 80
<211> 120
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone 2SD4 VH

<400> 80

Gln Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Arg
1 5 10 15

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

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

Ser Ala Ile Thr Trp Asn Ser Gly His Ile Asp Tyr Ala Asp Ser Val
50 55 60

Glu Gly Arg Phe Ala Val Ser Arg Asp Asn Ala Lys Asn Ala Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Pro Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Thr Lys Ala Ser Tyr Leu Ser Thr Ser Ser Leu Asp Asn Trp Gly Gln
100 105 110

Gly Thr Leu Val Thr Val Ser Ser
115 120

<210> 81
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone 2SD4 VL

<400> 81

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

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

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
35 40 45

Tyr Ala Ala Ser Thr Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

Glu Asp Val Ala Thr Tyr Tyr Cys Gln Lys Tyr Asn Ser Ala Pro Tyr
85 90 95

Ala Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 82
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone 2SD4 VL - CDRH3 (Kabat, AbM)

<400> 82

Ala Ser Tyr Leu Ser Thr Ser Ser Leu Asp Asn
1 5 10

<210> 83
<211> 13
<212> PRT
<213> Artificial Sequence

<220>

<223> Anti-TNFa scFv clone 2SD4 VL - CDRH3 (IMGT)

<400> 83

Thr Lys Ala Ser Tyr Leu Ser Thr Ser Ser Leu Asp Asn
1   5   10

<210> 84
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone 2SD4 VL - CDRL3 (Kabat, AbM, IMGT)

<400> 84

Gln Lys Tyr Asn Ser Ala Pro Tyr Ala
1   5

<210> 85
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab VH

<400> 85

Glu Val Lys Leu Glu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

Ser Met Lys Leu Ser Cys Val Ala Ser Gly Phe Ile Phe Ser Asn His
            20   25   30

Trp Met Asn Trp Val Arg Gln Ser Pro Glu Lys Gly Leu Glu Trp Val
        35   40   45

Ala Glu Ile Arg Ser Lys Ser Ile Asn Ser Ala Thr His Tyr Ala Glu
    50   55   60

Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asp Ser Lys Ser Ala
65   70   75   80

```
Val Tyr Leu Gln Met Thr Asp Leu Arg Thr Glu Asp Thr Gly Val Tyr
                85                  90                  95


Tyr Cys Ser Arg Asn Tyr Tyr Gly Ser Thr Tyr Asp Tyr Trp Gly Gln
            100                 105                 110


Gly Thr Thr Leu Thr Val Ser
        115


<210>  86
<211>  107
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-TNFa scFv clone cA2 - Infliximab VL

<400>  86

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


Glu Arg Val Ser Phe Ser Cys Arg Ala Ser Gln Phe Val Gly Ser Ser
            20                  25                  30


Ile His Trp Tyr Gln Gln Arg Thr Asn Gly Ser Pro Arg Leu Leu Ile
        35                  40                  45


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


Ser Gly Ser Gly Thr Asp Phe Thr Leu Ser Ile Asn Thr Val Glu Ser
65                  70                  75                  80


Glu Asp Ile Ala Asp Tyr Tyr Cys Gln Gln Ser His Ser Trp Pro Phe
                85                  90                  95


Thr Phe Gly Ser Gly Thr Asn Leu Glu Val Lys
            100                 105
```

<210> 87
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH1 (Kabat)

<400> 87

Asn His Trp Met Asn
1   5

<210> 88
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH1 (AbM)

<400> 88

Gly Phe Ile Phe Ser Asn His Trp Met Asn
1   5   10

<210> 89
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH1 (IMGT)

<400> 89

Gly Phe Ile Phe Ser Asn His Trp
1   5

<210> 90
<211> 19
<212> PRT
<213> Artificial Sequence

<220>

<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH2 (Kabat)

<400> 90

Glu Ile Arg Ser Lys Ser Ile Asn Ser Ala Thr His Tyr Ala Glu Ser
1   5   10   15

Val Lys Gly

<210> 91
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH2 (AbM)

<400> 91

Glu Ile Arg Ser Lys Ser Ile Asn Ser Ala Thr His
1   5   10

<210> 92
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH2 (IMGT)

<400> 92

Ile Arg Ser Lys Ser Ile Asn Ser Ala Thr
1   5   10

<210> 93
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH3 (Kabat, AbM)

<400> 93

Asn Tyr Tyr Gly Ser Thr Tyr Asp Tyr
1   5

<210> 94
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRH3 (IMGT)

<400> 94

Ser Arg Asn Tyr Tyr Gly Ser Thr Tyr Asp Tyr
1   5   10

<210> 95
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRL1 (Kabat, AbM)

<400> 95

Arg Ala Ser Gln Phe Val Gly Ser Ser Ile His
1   5   10

<210> 96
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRL1 (IMGT)

<400> 96

Gln Phe Val Gly Ser Ser
1   5

<210> 97
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRL2 (Kabat, AbM)

<400> 97

Tyr Ala Ser Glu Ser Met Ser
1   5

<210> 98
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRL2 (IMGT)

<400> 98

Tyr Ala
1

<210> 99
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone cA2 - Infliximab - CDRL3 (Kabat, AbM, IMGT)

<400> 99

Gln Gln Ser His Ser Trp Pro Phe Thr
1   5

<210> 100
<211> 123
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab VH

<400> 100

Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

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


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


Ser Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val
    50                  55                  60


Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80


Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95


Ala Lys Asp Gly Ser Ser Gly Trp Tyr Val Pro His Trp Phe Asp Pro
            100                 105                 110


Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser
        115                 120


<210>  101
<211>  112
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-IFNy NovImmune Clone A6 - Emapalumab VL

<400>  101

Asn Phe Met Leu Thr Gln Pro His Ser Val Ser Glu Ser Pro Gly Lys
1               5                   10                  15


Thr Val Thr Ile Ser Cys Thr Arg Ser Ser Gly Ser Ile Val Ser Asn
            20                  25                  30


Tyr Val Gln Trp Tyr Gln Gln Arg Pro Gly Ser Ala Pro Thr Thr Val
        35                  40                  45
```

```
Ile Tyr Glu Asp Asn Arg Arg Pro Ser Gly Val Pro Asp Arg Phe Ser
    50                  55                  60


Gly Ser Ile Asp Ser Ser Ser Asn Thr Ala Ser Leu Thr Ile Ser Gly
65                  70                  75                  80


Leu Glu Ala Glu Asp Glu Ala Asp Tyr Tyr Cys Gln Ser Tyr Asp Gly
                85                  90                  95


Ser Asn Arg Trp Met Phe Gly Gly Gly Thr Lys Leu Thr Val Leu Gly
            100                 105                 110


<210>  102
<211>  17
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-IFNy NovImmune Clone A6 - Emapalumab  - CDRH2 (Kabat)

<400>  102

Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr Tyr Ala Asp Ser Val Lys
1               5                   10                  15


Gly



<210>  103
<211>  10
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-IFNy NovImmune Clone A6 - Emapalumab  - CDRH2 (AbM)

<400>  103

Ala Ile Ser Gly Ser Gly Gly Ser Thr Tyr
1               5                   10
```

<210> 104
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRH2 (IMGT)

<400> 104

Ile Ser Gly Ser Gly Gly Ser Thr
1   5

<210> 105
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRH3 (Kabat, AbM)

<400> 105

Asp Gly Ser Ser Gly Trp Tyr Val Pro His Trp Phe Asp Pro
1   5   10

<210> 106
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRH3 (IMGT)

<400> 106

Ala Lys Asp Gly Ser Ser Gly Trp Tyr Val Pro His Trp Phe Asp Pro
1   5   10   15

<210> 107
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRL1 (Kabat, AbM)

<400> 107

Thr Arg Ser Ser Gly Ser Ile Val Ser Asn Tyr Val Gln
1 5 10

<210> 108
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRL1 (IMGT)

<400> 108

Ser Gly Ser Ile Val Ser Asn Tyr
1 5

<210> 109
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRL2 (Kabat, AbM)

<400> 109

Glu Asp Asn Arg Arg Pro Ser
1 5

<210> 110
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRL2 (IMGT)

<400> 110

Glu Asp
1

<210> 111
<211> 10

<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy NovImmune Clone A6 - Emapalumab - CDRL3 (Kabat, AbM, IMGT)

<400> 111

Gln Ser Tyr Asp Gly Ser Asn Arg Trp Met
1 5 10

<210> 112
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab VH

<400> 112

Gln Val Gln Leu Val Gln Ser Gly Ala Glu Leu Lys Lys Pro Gly Ser
1 5 10 15

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

Trp Ile Asn Trp Val Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile Gly
35 40 45

Arg Ile Asp Pro Ser Asp Gly Glu Val His Tyr Asn Gln Asp Phe Lys
50 55 60

Asp Lys Ala Thr Leu Thr Thr Val Asp Lys Ser Thr Asn Thr Ala Tyr
65 70 75 80

Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Gly Phe Leu Pro Trp Phe Ala Asp Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
        115

<210> 113
<211> 108
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab VL

<400> 113

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

Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Glu Asn Val Asp Thr Tyr
            20   25   30

Val Ser Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35   40   45

Tyr Gly Ala Ser Asn Arg Tyr Thr Gly Val Pro Ser Arg Phe Ser Gly
    50   55   60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65   70   75   80

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

Thr Phe Gly Gln Gly Thr Lys Val Glu Val Lys Arg
            100   105

<210> 114
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH1 (Kabat)

<400> 114

Ser Ser Trp Ile Asn
1 5

<210> 115
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH1 (AbM)

<400> 115

Gly Tyr Ile Phe Thr Ser Ser Trp Ile Asn
1 5 10

<210> 116
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH1 (IMGT)

<400> 116

Gly Tyr Ile Phe Thr Ser Ser Trp
1 5

<210> 117
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH2 (Kabat)

<400> 117

Arg Ile Asp Pro Ser Asp Gly Glu Val His Tyr Asn Gln Asp Phe Lys
1 5 10 15

Asp

<210> 118
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH2 (AbM)

<400> 118

Ile Asp Pro Ser Asp Gly Glu Val
1   5

<210> 119
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH2 (IMGT)

<400> 119

Arg Ile Asp Pro Ser Asp Gly Glu Val His
1   5   10

<210> 120
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH3 (Kabat, AbM)

<400> 120

Gly Phe Leu Pro Trp Phe Ala Asp
1   5

<210> 121
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRH3 (IMGT)

<400> 121

Ala Arg Gly Phe Leu Pro Trp Phe Ala Asp
1   5   10

<210> 122
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRL1 (Kabat, AbM)

<400> 122

Lys Ala Ser Glu Asn Val Asp Thr Tyr Val Ser
1   5   10

<210> 123
<211> 6
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRL1 (IMGT)

<400> 123

Glu Asn Val Asp Thr Tyr
1   5

<210> 124
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRL2 (Kabat, AbM)

<400> 124

Gly Ala Ser Asn Arg Tyr Thr
1   5

<210> 125
<211> 2
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab & Anti-IL17A Clone AIN457 -
       Secukinumab - CDRL2 (IMGT)

<400> 125

Gly Ala
1

<210> 126
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IFNy HuZAF - Fontolizumab - CDRL3 (Kabat, AbM, IMGT)

<400> 126

Gly Gln Ser Tyr Asn Tyr Pro Phe Thr
1   5

<210> 127
<211> 127
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab VH

<400> 127

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1   5   10   15

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

Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
        35   40   45

```
Ala Ala Ile Asn Gln Asp Gly Ser Glu Lys Tyr Tyr Val Gly Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Val Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Val Arg Asp Tyr Tyr Asp Ile Leu Thr Asp Tyr Tyr Ile His Tyr Trp
            100                 105                 110

Tyr Phe Asp Leu Trp Gly Arg Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
```

<210> 128
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab VL

<400> 128

```
Glu Ile Val Leu Thr Gln Ser Pro Gly Thr Leu Ser Leu Ser Pro Gly
1               5                   10                  15

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Ser
            20                  25                  30

Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu
        35                  40                  45

Ile Tyr Gly Ala Ser Ser Arg Ala Thr Gly Ile Pro Asp Arg Phe Ser
    50                  55                  60

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Arg Leu Glu
65                  70                  75                  80
```

Pro Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Tyr Gly Ser Ser Pro
85 90 95

Cys Thr Phe Gly Gln Gly Thr Arg Leu Glu Ile Lys Arg
100 105

<210> 129
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH1 (Kabat)

<400> 129

Asn Tyr Trp Met Asn
1 5

<210> 130
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH1 (AbM)

<400> 130

Gly Phe Thr Phe Ser Asn Tyr Trp Met Asn
1 5 10

<210> 131
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH1 (IMGT)

<400> 131

Gly Phe Thr Phe Ser Asn Tyr Trp
1 5

<210> 132
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH2 (Kabat)

<400> 132

Ala Ile Asn Gln Asp Gly Ser Glu Lys Tyr Tyr Val Gly Ser Val Lys
1 5 10 15

Gly

<210> 133
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH2 (AbM)

<400> 133

Ala Ile Asn Gln Asp Gly Ser Glu Lys Tyr
1 5 10

<210> 134
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH2 (IMGT)

<400> 134

Ile Asn Gln Asp Gly Ser Glu Lys
1 5

<210> 135
<211> 18

<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH3 (Kabat, AbM)

<400> 135

Asp Tyr Tyr Asp Ile Leu Thr Asp Tyr Tyr Ile His Tyr Trp Tyr Phe
1   5   10   15

Asp Leu

<210> 136
<211> 20
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRH3 (IMGT)

<400> 136

Val Arg Asp Tyr Tyr Asp Ile Leu Thr Asp Tyr Tyr Ile His Tyr Trp
1   5   10   15

Tyr Phe Asp Leu
            20

<210> 137
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRL1 (Kabat, AbM)

<400> 137

Arg Ala Ser Gln Ser Val Ser Ser Ser Tyr Leu Ala
1   5   10

<210> 138
<211> 7

<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRL1 (IMGT)

<400> 138

Gln Ser Val Ser Ser Ser Tyr
1   5

<210> 139
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRL2 (Kabat, AbM)

<400> 139

Gly Ala Ser Ser Arg Ala Thr
1   5

<210> 140
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone AIN457 - Secukinumab - CDRL3 (Kabat, AbM, IMGT)

<400> 140

Gln Gln Tyr Gly Ser Ser Pro Cys Thr
1   5

<210> 141
<211> 119
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab VH

<400> 141

```
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ser
1               5                   10                  15


Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Asp Tyr
            20                  25                  30


His Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45


Gly Val Ile Asn Pro Met Tyr Gly Thr Thr Asp Tyr Asn Gln Arg Phe
    50                  55                  60


Lys Gly Arg Val Thr Ile Thr Ala Asp Glu Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80


Met Glu Leu Ser Ser Leu Arg Ser Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95


Ala Arg Tyr Asp Tyr Phe Thr Gly Thr Gly Val Tyr Trp Gly Gln Gly
            100                 105                 110


Thr Leu Val Thr Val Ser Ser
        115


<210>  142
<211>  112
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-IL17A Clone Mab126 - Ixekizumab VL

<400>  142

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


Gln Pro Ala Ser Ile Ser Cys Arg Ser Ser Arg Ser Leu Val His Ser
            20                  25                  30
```

```
Arg Gly Asn Thr Tyr Leu His Trp Tyr Leu Gln Lys Pro Gly Gln Ser
        35                  40                  45


Pro Gln Leu Leu Ile Tyr Lys Val Ser Asn Arg Phe Ile Gly Val Pro
    50                  55                  60


Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Lys Ile
65                  70                  75                  80


Ser Arg Val Glu Ala Glu Asp Val Gly Val Tyr Tyr Cys Ser Gln Ser
                85                  90                  95


Thr His Leu Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110


<210>  143
<211>  5
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-IL17A Clone Mab126 - Ixekizumab - CDRH1 (Kabat)

<400>  143

Asp Tyr His Ile His
1               5


<210>  144
<211>  10
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-IL17A Clone Mab126 - Ixekizumab - CDRH1 (AbM)

<400>  144

Gly Tyr Ser Phe Thr Asp Tyr His Ile His
1               5                   10


<210>  145
<211>  8
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<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRH1 (IMGT)

<400> 145

Gly Tyr Ser Phe Thr Asp Tyr His
1   5

<210> 146
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRH2 (Kabat)

<400> 146

Val Ile Asn Pro Met Tyr Gly Thr Thr Asp Tyr Asn Gln Arg Phe Lys
1   5   10   15

Gly

<210> 147
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRH2 (AbM)

<400> 147

Val Ile Asn Pro Met Tyr Gly Thr Thr Asp
1   5   10

<210> 148
<211> 8
<212> PRT
<213> Artificial Sequence

<220>

<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRH2 (IMGT)

<400> 148

Ile Asn Pro Met Tyr Gly Thr Thr
1   5

<210> 149
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRH3 (Kabat, AbM)

<400> 149

Tyr Asp Tyr Phe Thr Gly Thr Gly Val Tyr
1   5   10

<210> 150
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRH3 (IMGT)

<400> 150

Ala Arg Tyr Asp Tyr Phe Thr Gly Thr Gly Val Tyr
1   5   10

<210> 151
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRL1 (Kabat, AbM)

<400> 151

Arg Ser Ser Arg Ser Leu Val His Ser Arg Gly Asn Thr Tyr Leu His
1   5   10   15

<210> 152
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRL1 (IMGT)

<400> 152

Arg Ser Leu Val His Ser Arg Gly Asn Thr Tyr
1 5 10

<210> 153
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRL2 (Kabat, AbM)

<400> 153

Lys Val Ser Asn Arg Phe Ile
1 5

<210> 154
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-IL17A Clone Mab126 - Ixekizumab - CDRL3 (Kabat, AbM, IMGT)

<400> 154

Ser Gln Ser Thr His Leu Pro Phe Thr
1 5

<210> 155
<211> 24
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a CD8 transmembrane domain

<400> 155

Ile Tyr Ile Trp Ala Pro Leu Ala Gly Thr Cys Gly Val Leu Leu Leu
1 5 10 15

Ser Leu Val Ile Thr Leu Tyr Cys
20

<210> 156
<211> 3
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a IgG4 hinge

<220>
<221> misc_feature
<222> (1)..(3)
<223> Xaa can be any naturally occurring amino acid

<400> 156

Xaa Xaa Xaa
1

<210> 157
<211> 282
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a IgD hinge

<400> 157

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
            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

<210> 158
<211> 42
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a 4-1BB co-stimulatrory intracellular signalling domain

<400> 158

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> 159
<211> 48
<212> PRT
<213> Artificial Sequence

<220>
<223> Exmplary amino acid sequence of a CD27 co-stimulatory intracellular signalling domain

<400> 159

Gln Arg Arg Lys Tyr Arg Ser Asn Lys Gly Glu Ser Pro Val Glu Pro
1 5 10 15

Ala Glu Pro Cys Arg Tyr Ser Cys Pro Arg Glu Glu Glu Gly Ser Thr
            20   25   30

Ile Pro Ile Gln Glu Asp Tyr Arg Lys Pro Glu Pro Ala Cys Ser Pro
        35   40   45

<210> 160
<211> 459
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a CAR comprising IFN-gamma scFv
       TII 2G1G7, a IgG4 hinge region, a CD28 transmembrane domain, a
       CD28 co-stimulatory domain, and a CD3 zeta signalling domain
       (with leader sequence)

<400> 160

Met Ala Leu Pro Val Thr Ala Leu Leu Leu Pro Leu Ala Leu Leu Leu
1   5   10   15

His Ala Ala Arg Pro Gln Val Lys Leu Glu Gln Ser Gly Pro Gly Leu
            20   25   30

Val Ala Pro Ser Gln Ser Leu Ser Ile Thr Cys Thr Val Ser Gly Phe
        35   40   45

Ser Leu Thr Ser Tyr Gly Val His Trp Val Arg Gln Ser Pro Gly Lys
    50   55   60

Gly Leu Glu Trp Leu Gly Val Ile Trp Ala Gly Gly Ser Thr Asn Tyr
65   70   75   80

Asn Ser Ala Leu Met Ser Arg Leu Ser Ile Ser Lys Asp Asn Ser Lys
                85   90   95

Ser Gln Val Phe Leu Lys Met Asn Ser Leu Gln Thr Asp Asp Thr Ala
            100   105   110

Met Tyr Tyr Cys Ala Arg Arg Asp Gly Asn Arg Tyr Tyr Thr Met Asp

```
        115                 120                 125

Tyr Trp Gly Gln Gly Ala Ser Val Thr Val Ser Ser Gly Gly Gly Gly
    130                 135                 140

Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Glu Asn Val Leu Thr
145                 150                 155                 160

Gln Ser Pro Ala Ile Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met
                165                 170                 175

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

Gln Gln Lys Ser Gly Gly Ser Pro Lys Leu Trp Ile Tyr Arg Thr Ser
        195                 200                 205

Asn Leu Ala Ser Gly Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly
    210                 215                 220

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

Thr Tyr Tyr Cys Gln Gln Tyr Ser Gly Tyr Pro Leu Thr Phe Gly Ala
                245                 250                 255

Gly Thr Lys Leu Glu Leu Lys Arg Ala Ser Ala Glu Ser Lys Tyr Gly
            260                 265                 270

Pro Pro Cys Pro Pro Cys Pro Phe Trp Val Leu Val Val Val Gly Gly
        275                 280                 285

Val Leu Ala Cys Tyr Ser Leu Leu Val Thr Val Ala Phe Ile Ile Phe
    290                 295                 300

Trp Val Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn
305                 310                 315                 320
```

```
Met Thr Pro Arg Arg Leu Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr
                325                 330                 335

Ala Pro Pro Arg Asp Phe Ala Ala Tyr Arg Ser Arg Val Lys Phe Ser
            340                 345                 350

Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu Tyr
        355                 360                 365

Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys
    370                 375                 380

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

Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu
                405                 410                 415

Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly
            420                 425                 430

His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr
        435                 440                 445

Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
    450                 455
```

<210> 161
<211> 460
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of CAR PMC882 comprising the TNF alpha scFv, a CD28 hinge, a CD28 transmembrane domain, a CD28 co-stimulatory domain, and a CD3 zeta signalling domain (without leader sequence)

<400> 161

```
Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1               5                   10                  15

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

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

Ser Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr Tyr Ala Asp Ser Val
    50                  55                  60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu Tyr
65                  70                  75                  80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95

Ala Lys Gly Gly Ala Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly Gly
        115                 120                 125

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

Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile
145                 150                 155                 160

Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
                165                 170                 175

Leu Leu Ile Tyr Ser Ala Ser Tyr Leu Gln Ser Gly Val Pro Ser Arg
            180                 185                 190

Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser
        195                 200                 205
```

```
Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala Asn Asn
    210                 215                 220

Ala Pro Thr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Ala Ser
225                 230                 235                 240

Ala Ile Glu Val Met Tyr Pro Pro Pro Tyr Leu Asp Asn Glu Lys Ser
                245                 250                 255

Asn Gly Thr Ile Ile His Val Lys Gly Lys His Leu Cys Pro Ser Pro
            260                 265                 270

Leu Phe Pro Gly Pro Ser Lys Pro Phe Trp Val Leu Val Val Val Gly
        275                 280                 285

Gly Val Leu Ala Cys Tyr Ser Leu Leu Val Thr Val Ala Phe Ile Ile
    290                 295                 300

Phe Trp Val Arg Ser Lys Arg Ser Arg Leu Leu His Ser Asp Tyr Met
305                 310                 315                 320

Asn Met Thr Pro Arg Arg Leu Gly Pro Thr Arg Lys His Tyr Gln Pro
                325                 330                 335

Tyr Ala Pro Pro Arg Asp Phe Ala Ala Tyr Arg Ser Arg Val Lys Phe
            340                 345                 350

Ser Arg Ser Ala Asp Ala Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu
        355                 360                 365

Tyr Asn Glu Leu Asn Leu Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp
    370                 375                 380

Lys Arg Arg Gly Arg Asp Pro Glu Met Gly Gly Lys Pro Arg Arg Lys
385                 390                 395                 400
```

```
Asn Pro Gln Glu Gly Leu Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala
                405                 410                 415


Glu Ala Tyr Ser Glu Ile Gly Met Lys Gly Glu Arg Arg Arg Gly Lys
            420                 425                 430


Gly His Asp Gly Leu Tyr Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr
        435                 440                 445


Tyr Asp Ala Leu His Met Gln Ala Leu Pro Pro Arg
    450                 455                 460


<210>  162
<211>  117
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Anti-TNFa scFv clone P3H2 VH

<400>  162

Ala Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1               5                   10                  15


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


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


Val Ser Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr Tyr Ala Asp Ser
    50                  55                  60


Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80


Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95
```

Cys Ala Lys Gly Gly Ala Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu
100 105 110

Val Thr Val Ser Ser
115

<210> 163
<211> 112
<212> PRT
<213> Artificial Sequence

<220>
<223> Anti-TNFa scFv clone P3H2 VL

<400> 163

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

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

Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu
35 40 45

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

Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln
65 70 75 80

Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala Asn Asn Ala Pro
85 90 95

Thr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Ala Ala Ala
100 105 110

<210> 164
<211> 78
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a CD8a hinge

<400> 164

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 Ile Glu Val Met Tyr Pro Pro Pro Tyr
        35   40   45

Leu Asp Asn Glu Lys Ser Asn Gly Thr Ile Ile His Val Lys Gly Lys
    50   55   60

His Leu Cys Pro Ser Pro Leu Phe Pro Gly Pro Ser Lys Pro
65   70   75

<210> 165
<211> 438
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a CAR comprising IFN-gamma scFv
       TII 2G1G7, a IgG4 hinge region, a CD28 transmembrane domain, a
       CD28 co-stimulatory domain, and a CD3 zeta signalling domain
       (without leader sequence)

<400> 165

Gln Val Lys Leu Glu Gln Ser Gly Pro Gly Leu Val Ala Pro Ser Gln
1   5   10   15

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

Gly Val His Trp Val Arg Gln Ser Pro Gly Lys Gly Leu Glu Trp Leu
        35   40   45

```
Gly Val Ile Trp Ala Gly Gly Ser Thr Asn Tyr Asn Ser Ala Leu Met
    50                  55                  60

Ser Arg Leu Ser Ile Ser 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 Met Tyr Tyr Cys Ala
                85                  90                  95

Arg Arg Asp Gly Asn Arg Tyr Tyr Thr Met Asp Tyr Trp Gly Gln Gly
            100                 105                 110

Ala Ser Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly
        115                 120                 125

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

Met Ser Ala Ser Pro Gly Glu Lys Val Thr Met Thr Cys Arg Ala Ser
145                 150                 155                 160

Ser Ser Val Ser Ser Ser Tyr Leu His Trp Tyr Gln Gln Lys Ser Gly
                165                 170                 175

Gly Ser Pro Lys Leu Trp Ile Tyr Arg Thr Ser Asn Leu Ala Ser Gly
            180                 185                 190

Val Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Ser Tyr Ser Leu
        195                 200                 205

Thr Ile Ser Ser Val Glu Ala Glu Asp Ala Ala Thr Tyr Tyr Cys Gln
    210                 215                 220

Gln Tyr Ser Gly Tyr Pro Leu Thr Phe Gly Ala Gly Thr Lys Leu Glu
225                 230                 235                 240

Leu Lys Arg Ala Ser Ala Glu Ser Lys Tyr Gly Pro Pro Cys Pro Pro
```

```
                245                 250                 255

Cys Pro Phe Trp Val Leu Val Val Val Gly Gly Val Leu Ala Cys Tyr
            260                 265                 270

Ser Leu Leu Val Thr Val Ala Phe Ile Ile Phe Trp Val Arg Ser Lys
        275                 280                 285

Arg Ser Arg Leu Leu His Ser Asp Tyr Met Asn Met Thr Pro Arg Arg
    290                 295                 300

Leu Gly Pro Thr Arg Lys His Tyr Gln Pro Tyr Ala Pro Pro Arg Asp
305                 310                 315                 320

Phe Ala Ala Tyr Arg Ser Arg Val Lys Phe Ser Arg Ser Ala Asp Ala
                325                 330                 335

Pro Ala Tyr Gln Gln Gly Gln Asn Gln Leu Tyr Asn Glu Leu Asn Leu
            340                 345                 350

Gly Arg Arg Glu Glu Tyr Asp Val Leu Asp Lys Arg Arg Gly Arg Asp
        355                 360                 365

Pro Glu Met Gly Gly Lys Pro Arg Arg Lys Asn Pro Gln Glu Gly Leu
    370                 375                 380

Tyr Asn Glu Leu Gln Lys Asp Lys Met Ala Glu Ala Tyr Ser Glu Ile
385                 390                 395                 400

Gly Met Lys Gly Glu Arg Arg Arg Gly Lys Gly His Asp Gly Leu Tyr
                405                 410                 415

Gln Gly Leu Ser Thr Ala Thr Lys Asp Thr Tyr Asp Ala Leu His Met
            420                 425                 430

Gln Ala Leu Pro Pro Arg
        435
```

<210> 166
<211> 244
<212> PRT
<213> Artificial Sequence

<220>
<223> Exemplary amino acid sequence of a TNF-alpha scFv clone P3H2 - v2

<400> 166

```
Ala Glu Val Gln Leu Leu Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1               5                   10                  15


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


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


Val Ser Ser Ile Ser Ser Thr Gly Ala Ser Thr Thr Tyr Ala Asp Ser
    50                  55                  60


Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser Lys Asn Thr Leu
65                  70                  75                  80


Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr
                85                  90                  95


Cys Ala Lys Gly Gly Ala Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110


Val Thr Val Ser Ser Gly Gly Gly Gly Ser Gly Gly Gly Gly Ser Gly
        115                 120                 125


Gly Gly Gly Ser Thr Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu
    130                 135                 140


Ser Ala Ser Val Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln
145                 150                 155                 160
```

```
Ser Ile Ser Ser Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala
                165                 170                 175

Pro Lys Leu Leu Ile Tyr Ser Ala Ser Tyr Leu Gln Ser Gly Val Pro
            180                 185                 190

Ser Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
        195                 200                 205

Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ala
    210                 215                 220

Asn Asn Ala Pro Thr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
225                 230                 235                 240

Arg Ala Ala Ala
```