SEQUENCE LISTING

<110> Nai-Kong, Cheung
Dimiter, Tassev
Hu, Jian

<120> HLA-A2 Restricted Peptide-Specific Antibodies and Chimeric Antigen Receptors

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<150> US 13/984,646
<151> 2013-09-24

<150> PCT/US12/24885
<151> 2012-02-13

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<151> 2011-02-11

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

Ser Gln Ile Asp Pro Trp Gly Gln Glu Thr Leu 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 Leu Thr Gly Arg Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Tyr Met Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
225 230 235 240

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gcagactccg tgaagggccg gttcactatc tccagagaca attccaagaa cacgctgtat 240

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tatctggcat ccaatttgca aagtggggtc ccatcaaggt tcagtggcag tggatctggg 600

acagatttca ctctcaccat cagcagtctg caacctgaag attttgcaac ttactactgt 660

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

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

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

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

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

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

Gly Ser Thr 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 Tyr 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 Ser Ser Ser
    210                 215                 220

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

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gactccgtga agggcaggtt caccatctcc agagacaatt ccaagaacac gctgtatctg 240

caaatgaaca gcctgagagc cgaggacacg gccgtatatt actgtgcgaa aactactgat 300

tattttgact actggggcca gggaaccctg gtcaccgtct cgagcggtgg aggcggttca 360

ggcggaggtg gcagcggcgg tggcgggtcg acggacatcc agatgaccca gtctccatcc 420

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gatttcactc tcaccatcag cagtctgcaa cctgaagatt ttgcaactta ctactgtcaa 660

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gcc 723

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<212> PRT
<213> Homo sapiens

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

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

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

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

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

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

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

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<212> DNA
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gcagactccg tgaagggcag gttcaccatc tccagagaca attccaagaa cacgctgtat 240

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actacttttg actactgggg ccagggaacc ctggtcaccg tctcgagcgg tggaggcggt 360

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attagcagct atttaaattg gtatcagcag aaaccaggga aagcccctaa gctcctgatc 540

tatgctgcat ccgccttgca aagtggggtc ccatcaaggt tcagtggcag tggatctggg 600

acagatttca ctctcaccat cagcagtctg caacctgaag attttgcaac ttactactgt 660

caacagggta ctgatagtcc tgctacgttc ggccaaggga ccaaggtgga aatcaaacgg 720

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<213> Homo sapiens

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<210> 13
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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 Asp Ile Ala Ser Thr Gly Tyr Tyr Thr Asp 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 Asn Asn Ala Ser 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 Thr Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser
130 135 140

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

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

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

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

Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Thr Asp

210 215 220

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

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

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

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

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

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

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

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

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<212> DNA
<213> Homo sapiens

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tcctccctgt ctgcatctgt aggagacaga gtcaccatca cttgccgggc aagtcagagc 480

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tatgatgcat ccactttgca aagtggggtc ccatcaaggt tcagtggcag tggatctggg 600

acagatttca ctctcaccat cagcagtctg caacctgaag attttgcaac ttactactgt 660

caacagactg attcttatcc tactacgttc ggccaaggga ccaaggtgga aatcaaacgg 720

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<213> Homo sapiens

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gcagactccg tgaagggccg gttcaccatc tccagagaca attccaagaa cacgctgtat 240

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attagcagct atttaaattg gtatcagcag aaaccaggga aagcccctaa gctcctgatc 540

tatgatgcat ccactttgca aagtggggtc ccatcaaggt tcagtggcag tggatctggg 600

acagatttca ctctcaccat cagcagtctg caacctgaag attttgcaac ttactactgt 660

caacaggatg atgcttatcc tactacgttc ggccaaggga ccaaggtgga aatcaaacgg 720

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<213> Homo sapiens

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

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

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

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

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

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

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

<210> 18

<211> 720
<212> DNA
<213> Homo sapiens

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attagcagct atttaaattg gtatcagcag aaaccaggga aagcccctaa gctcctgatc 540

tatgctgcat cctatttgca aagtggggtc ccatcaaggt tcagtggcag tggatctggg 600

acagatttct ctctcaccat cagcagtctg caacctgaag attttgcaac ttactactgt 660

caacaggata ataattatcc tactacgttc ggccaaggga ccaaggtgga aatcaaacgg 720

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1 5

<210> 20
<211> 240
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<400> 20

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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 Thr Ile Asn Tyr Ser Gly Ser Gly 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

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

Ala Lys Asn Ala Ala Tyr 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 Thr Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser
    130                 135                 140

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

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

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

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

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

Asn Ala Pro Thr Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg
225                 230                 235                 240
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<400> 21

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attagcagct atttaaattg gtatcagcag aaaccaggga aagcccctaa gctcctgatc      540

tatggtgcat ccggtttgca aagtggggtc ccatcaaggt tcagtggcag tggatctggg      600

acagatttca ctctcaccat cagcagtctg caacctgaag attttgcaac ttactactgt      660
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20 25 30

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

Ser Gln Ile Asp Pro Trp Gly Gln Glu Thr Leu 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 Leu Thr Gly Arg Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser
115

<210> 23
<211> 111
<212> PRT
<213> Homo sapiens

<400> 23

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

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

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

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

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

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

Pro Asn Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys Arg Ala
            100                 105                 110
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<210> 24
<211> 115
<212> PRT
<213> Homo sapiens

<400> 24

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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 Gly Tyr
            20                  25                  30

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

Ser Glu Ile Ala Pro Pro Gly Leu Asn Thr Arg 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 Ser Asp Thr Ala Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser
        115
```

<210> 25
<211> 111
<212> PRT
<213> Homo sapiens

<400> 25

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

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

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

Leu Ile Tyr Leu Ala Ser Asn Leu Gln Ser Gly Val Pro Ser Arg Phe
```

50 55 60

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

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

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

<210> 26
<211> 114
<212> PRT
<213> Homo sapiens

<400> 26

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

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

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

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

Val Ser

<210> 27
<211> 112
<212> PRT
<213> Homo sapiens

<400> 27

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

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

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


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


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


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


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


<210>  28
<211>  115
<212>  PRT
<213>  Homo sapiens

<400>  28

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


Thr Val Ser
        115


<210>  29
<211>  112
<212>  PRT
<213>  Homo sapiens

<400>  29

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

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

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

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

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

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

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


<210>  30
<211>  115
<212>  PRT
<213>  Homo sapiens

<400>  30

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 Asp Ile Ala Ser Thr Gly Tyr Tyr Thr Asp 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 Asn Asn Ala Ser Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
            100                 105                 110

Thr Val Ser
        115


<210>  31
<211>  110
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<212> PRT
<213> Homo sapiens

<400> 31

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

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

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

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

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

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

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

<210> 32
<211> 115
<212> PRT
<213> Homo sapiens

<400> 32

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

Thr Val Ser
        115

<210> 33
<211> 110
<212> PRT
<213> Homo sapiens

<400> 33

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

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

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

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

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

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

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

<210> 34
<211> 115
<212> PRT
<213> Homo sapiens

<400> 34

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


Thr Val Ser
        115


<210>  35
<211>  110
<212>  PRT
<213>  Homo sapiens

<400>  35

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


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


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


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


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


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


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


<210>  36
<211>  115
<212>  PRT
<213>  Homo sapiens

<400>  36

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 Thr Ile Asn Tyr Ser Gly Ser Gly 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 Asn Ala Ala Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110

Thr Val Ser
115

<210> 37
<211> 110
<212> PRT
<213> Homo sapiens

<400> 37

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

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

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

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

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

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

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

<210> 38
<211> 5
<212> PRT
<213> Homo sapiens

<400> 38

Ser Tyr Ala Met Ser
1 5

<210> 39
<211> 5
<212> PRT
<213> Homo sapiens

<400> 39

Gly Tyr Ala Met Ser
1 5

<210> 40
<211> 17
<212> PRT
<213> Homo sapiens

<400> 40

Gln Ile Asp Pro Trp Gly Gln Glu Thr Leu Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 41
<211> 17
<212> PRT
<213> Homo sapiens

<400> 41

Glu Ile Ala Pro Pro Gly Leu Asn Thr Arg Tyr Ala Asp Ser Val Lys
1 5 10 15

Gly

<210> 42
<211> 16
<212> PRT
<213> Homo sapiens

<400> 42

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

<210> 43
<211> 17
<212> PRT
<213> Homo sapiens

<400> 43

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

Gly

<210> 44
<211> 17
<212> PRT
<213> Homo sapiens

<400> 44

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

Gly

<210> 45
<211> 17
<212> PRT
<213> Homo sapiens

<400> 45

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

Gly

<210> 46
<211> 17
<212> PRT
<213> Homo sapiens

<400> 46

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

Gly

<210> 47
<211> 17
<212> PRT
<213> Homo sapiens

<400> 47

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

Gly

<210> 48
<211> 7
<212> PRT
<213> Homo sapiens

<400> 48

Leu Thr Gly Arg Phe Asp Tyr
1 5

<210> 49
<211> 7
<212> PRT
<213> Homo sapiens

<400> 49

Ser Asp Thr Ala Phe Asp Tyr
1 5

<210> 50
<211> 7
<212> PRT
<213> Homo sapiens

<400> 50

Thr Thr Asp Tyr Phe Asp Tyr
1 5

<210> 51
<211> 7
<212> PRT
<213> Homo sapiens

<400> 51

Ser Ser Thr Thr Phe Asp Tyr
1 5

<210> 52
<211> 7
<212> PRT
<213> Homo sapiens

<400> 52

Asn Asn Ala Ser Phe Asp Tyr
1 5

<210> 53
<211> 7
<212> PRT
<213> Homo sapiens

<400> 53

Ser Ala Ser Ser Phe Asp Tyr
1 5

<210> 54
<211> 7
<212> PRT
<213> Homo sapiens

<400> 54

Ser Thr Asp Ala Phe Asp Tyr
1 5

<210> 55
<211> 7
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<400> 55

Asn Ala Ala Tyr Phe Asp Tyr
1 5

<210> 56
<211> 11
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<213> Homo sapiens

<400> 56

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

<210> 57
<211> 7
<212> PRT
<213> Homo sapiens

<400> 57

Ser Ala Ser Gln Leu Gln Ser
1 5

<210> 58
<211> 7
<212> PRT
<213> Homo sapiens

<400> 58

Leu Ala Ser Asn Leu Gln Ser
1 5

<210> 59
<211> 7
<212> PRT
<213> Homo sapiens

<400> 59

Tyr Ala Ser Tyr Leu Gln Ser
1 5

<210> 60
<211> 7
<212> PRT
<213> Homo sapiens

<400> 60

Ala Ala Ser Ala Leu Gln Ser
1 5

<210> 61
<211> 7
<212> PRT
<213> Homo sapiens

<400> 61

Asp Ala Ser Thr Leu Gln Ser

1 5

<210> 62
<211> 7
<212> PRT
<213> Homo sapiens

<400> 62

Ala Ala Ser Tyr Leu Gln Ser
1 5

<210> 63
<211> 7
<212> PRT
<213> Homo sapiens

<400> 63

Gly Ala Ser Gly Leu Gln Ser
1 5

<210> 64
<211> 9
<212> PRT
<213> Homo sapiens

<400> 64

Gln Gln Gly Pro Gly Thr Pro Asn Thr
1 5

<210> 65
<211> 9
<212> PRT
<213> Homo sapiens

<400> 65

Gln Gln Ala Glu Tyr Met Pro Leu Thr
1 5

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

<400> 66

Gln Gln Ser Ser Ser Ser Pro Asp Thr
1 5

<210> 67
<211> 9
<212> PRT
<213> Homo sapiens

<400> 67

Gln Gln Gly Thr Asp Ser Pro Ala Thr
1 5

<210> 68
<211> 9
<212> PRT
<213> Homo sapiens

<400> 68

Gln Gln Thr Asp Ser Tyr Pro Thr Thr
1 5

<210> 69
<211> 9
<212> PRT
<213> Homo sapiens

<400> 69

Gln Gln Asp Asp Ala Tyr Pro Thr Thr
1 5

<210> 70
<211> 9
<212> PRT
<213> Homo sapiens

<400> 70

Gln Gln Asp Asn Asn Tyr Pro Thr Thr
1 5

<210> 71
<211> 9
<212> PRT
<213> Homo sapiens

<400> 71

Gln Gln Ser Ala Asn Ala Pro Thr Thr
1 5

<210> 72
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> reverse primer

<400> 72
cccttgaacc tcctcgttcg acc 23

<210> 73
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 73

Asn Leu Val Pro Met Val Ala Thr Val

1 5

<210> 74
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 74

Lys Leu Gln Cys Val Asp Leu His Val
1 5

<210> 75
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 75

Tyr Val Asp Pro Val Ile Thr Ser Ile
1 5

<210> 76
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 76

Tyr Met Phe Pro Asn Ala Pro Tyr Leu
1 5

<210> 77
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 77

Cys Met Thr Trp Asn Gln Met Asn Leu
1 5

<210> 78
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 78

Thr Leu Pro Pro Ala Trp Gln Pro Phe Leu
1 5 10

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

<220>
<223> Synthetic Peptide

<400> 79

Ser Leu Gly Glu Gln Gln Tyr Ser Val
1 5

<210> 80
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 80

Glu Leu Met Leu Gly Glu Phe Leu Lys Leu
1 5 10

<210> 81
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 81

Val Ile Ser Asn Asp Val Cys Ala Gln Val
1 5 10

<210> 82
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 82

Phe Leu Thr Pro Lys Lys Leu Gln Cys Val
1 5 10

<210> 83
<211> 10
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 83

Val Ile Leu Lys Lys Ala Thr Glu Tyr Val
1 5 10

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

<220>
<223> Synthetic Peptide

<400> 84

Ala Leu Leu Met Ala Gly Leu Ala Leu
1 5

<210> 85
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 85

Ala Leu Phe Asp Ile Glu Ser Lys Val
1 5

<210> 86
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic Peptide

<400> 86

Leu Met Leu Gly Glu Phe Leu Lys Leu
1 5