SEQUENCE LISTING

<110> Nijjar, Tarlochan S.
Saldanha, Jose

<120> Humanized Antibodies that Recognize Alpha-Synuclein

<130> 057450/429375

<140> PCT/US2013/023307
<141> 2013-01-25

<150> 61/591,835
<151> 2012-01-27

<150> 61/711,207
<151> 2012-10-08

<160> 58

<170> FastSEQ for Windows Version 4.0

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Thr Lys Glu Gly Val Leu Tyr Val Gly Ser Lys Thr Lys Glu Gly Val
35 40 45
Val His Gly Val Ala Thr Val Ala Glu Lys Thr Lys Glu Gln Val Thr
50 55 60
Asn Val Gly Gly Ala Val Val Thr Gly Val Thr Ala Val Ala Gln Lys
65 70 75 80
Thr Val Glu Gly Ala Gly Ser Ile Ala Ala Ala Thr Gly Phe Val Lys
85 90 95
Lys Asp Gln Leu Gly Lys Asn Glu Glu Gly Ala Pro Gln Glu Gly Ile
100 105 110
Leu Glu Asp Met Pro Val Asp Pro Asp Asn Glu Ala Tyr Glu Met Pro
115 120 125
Ser Glu Glu Gly Tyr Gln Asp Tyr Glu Pro Glu Ala
130 135 140

<210> 2
<211> 35
<212> PRT
<213> Homo sapiens

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1 5 10 15
Val Ala Gln Lys Thr Val Glu Gly Ala Gly Ser Ile Ala Ala Ala Thr
20 25 30
Gly Phe Val
35

<210> 3
<211> 28
<212> PRT
<213> Homo sapiens

<400> 3
Lys Glu Gln Val Thr Asn Val Gly Gly Ala Val Val Thr Gly Val Thr
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            20                  25


<210> 4
<211> 405
<212> DNA
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<220>
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tgcaaggctt ctggctacag cttcacaagc tactatatac actgggtgaa gcagagtcct 180
ggacagggac ttgagtggat tggatggatt tatcctggaa gtggtaatac taagtacagt 240
gagaagttca agggcaaggc cacactgact gcagacacat cctccagcac agcctacatg 300
cagctcagca gcctgacatc tgaggactct gcagtctatt tctgtgcaag agatggttgc 360
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<210> 5
<211> 135
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

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            20                  25                  30
Pro Gly Thr Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ser Phe
        35                  40                  45
Thr Ser Tyr Tyr Ile His Trp Val Lys Gln Ser Pro Gly Gln Gly Leu
    50                  55                  60
Glu Trp Ile Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser
65                  70                  75                  80
Glu Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Thr Ser Ser Ser
                85                  90                  95
Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
            100                 105                 110
Tyr Phe Cys Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln
        115                 120                 125
Gly Thr Leu Val Thr Val Ser
    130                 135


<210> 6
<211> 393
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

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gacattgtgc tgacccaatc tccagcttct ttggctgtgt ctctagggca gagggccacc 120
atctcctgca aggccagcca aagtgttgat tatgatggtg atagttatat gaactggtac 180
caacagaaac caggacagcc acccaaattc ctcatctgtg ctgcatccaa tctagaatct 240
gggatcccag ccaggtttag tggcagtggg tctgggacag acttcaccct caacatccat 300

cctgtggagg aggaggatgc tgcaacctat tactgtcagc aaagtaatga ggatccattc 360
acgttcggct cggggacaaa gttggaaata aaa 393

<210> 7
<211> 131
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 7
Met Glu Thr Asp Thr Leu Leu Leu Trp Val Leu Leu Leu Trp Val Pro
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Gly Ser Thr Gly Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala
            20                  25                  30
Val Ser Leu Gly Gln Arg Ala Thr Ile Ser Cys Lys Ala Ser Gln Ser
        35                  40                  45
Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro
    50                  55                  60
Gly Gln Pro Pro Lys Phe Leu Ile Cys Ala Ala Ser Asn Leu Glu Ser
65                  70                  75                  80
Gly Ile Pro Ala Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr
                85                  90                  95
Leu Asn Ile His Pro Val Glu Glu Glu Asp Ala Ala Thr Tyr Tyr Cys
            100                 105                 110
Gln Gln Ser Asn Glu Asp Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu
        115                 120                 125
Glu Ile Lys
    130


<210> 8
<211> 345
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

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tgcaaggctt ctggctacag cttcacaagc tactatatac actgggtgaa gcagagtcct 120
ggacagggac ttgagtggat tggatggatt tatcctggaa gtggtaatac taagtacagt 180
gagaagttca agggcaaggc cacactgact gcagacacat cctccagcac agcctacatg 240
cagctcagca gcctgacatc tgaggactct gcagtctatt tctgtgcaag agatggttgc 300
tacgggtttg cttactgggg ccaagggact ctggtcactg tctct 345

<210> 9
<211> 115
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 9
Val Gln Leu Gln Gln Ser Gly Pro Glu Leu Val Lys Pro Gly Thr Ser
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Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Ser Tyr Tyr
            20                  25                  30
Ile His Trp Val Lys Gln Ser Pro Gly Gln Gly Leu Glu Trp Ile Gly
        35                  40                  45
Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe Lys
    50                  55                  60
Gly Lys Ala Thr Leu Thr Ala Asp Thr Ser Ser Ser Thr Ala Tyr Met
65                  70                  75                  80
Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val Tyr Phe Cys Ala

85 90 95
Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu Val
100 105 110
Thr Val Ser
115

<210> 10
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

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gacattgtgc tgacccaatc tccagcttct ttggctgtgt ctctagggca gagggccacc 60
atctcctgca aggccagcca aagtgttgat tatgatggtg atagttatat gaactggtac 120
caacagaaac caggacagcc acccaaattc ctcatctgtg ctgcatccaa tctagaatct 180
gggatcccag ccaggtttag tggcagtggg tctgggacag acttcaccct caacatccat 240
cctgtggagg aggaggatgc tgcaacctat tactgtcagc aaagtaatga ggatccattc 300
acgttcggct cggggacaaa gttggaaata aaa 333

<210> 11
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 11
Asp Ile Val Leu Thr Gln Ser Pro Ala Ser Leu Ala Val Ser Leu Gly
1 5 10 15
Gln Arg Ala Thr Ile Ser Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
20 25 30
Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Gln Pro Pro
35 40 45
Lys Phe Leu Ile Cys Ala Ala Ser Asn Leu Glu Ser Gly Ile Pro Ala
50 55 60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Asn Ile His
65 70 75 80
Pro Val Glu Glu Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
85 90 95
Glu Asp Pro Phe Thr Phe Gly Ser Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 12
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 12
Ser Tyr Tyr Ile His
1 5

<210> 13
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 13
Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe Lys
 1               5                  10                  15
Gly

<210> 14
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 14
Asp Gly Cys Tyr Gly Phe Ala Tyr
 1               5

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

<220>
<223> Synthesized

<400> 15
Lys Ala Ser Gln Ser Val Asp Tyr Asp Gly Asp Ser Tyr Met Asn
 1               5                  10                  15

<210> 16
<211> 7
<212> PRT
<213> Artificial Sequence

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<400> 16
Ala Ala Ser Asn Leu Glu Ser
 1               5

<210> 17
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 17
Gln Gln Ser Asn Glu Asp Pro Phe Thr
 1               5

<210> 18
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 18
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tcctgcaagg cctccggcta ctccttcacc tcctactaca tccactgggt gaagcaggcc 120
cccggccagg gcctggagtg gatcggctgg atctaccccg gctccggcaa caccaagtac 180
tccgagaagt tcaagggccg cgccaccctg accgccgaca cctccacctc caccgcctac 240
atggagctgc gctccctgcg ctccgacgac accgccgtgt acttctgcgc ccgcgacggc 300
tgctacggct tcgcctactg gggccagggc accctggtga ccgtgtcctc a 351

<210> 19
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 19
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Leu Lys Lys Pro Gly Ala
 1               5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Ser Tyr
            20                  25                  30
Tyr Ile His Trp Val Lys Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60
Lys Gly Arg Ala Thr Leu Thr Ala Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Phe Cys
                85                  90                  95
Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser
        115


<210> 20
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

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tcctgcaagg cctccggcta ctccttcacc tcctactaca tccactgggt gcgccaggcc 120
cccggccagg gcctggagtg gatcggctgg atctaccccg gctccggcaa caccaagtac 180
tccgagaagt tcaagggccg cgccaccctg accgccgaca cctccacctc caccgcctac 240
atggagctgc gctccctgcg ctccgacgac accgccgtgt acttctgcgc ccgcgacggc 300
tgctacggct tcgcctactg gggccagggc accctggtga ccgtgtcctc a 351

<210> 21
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 21
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
 1               5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Ser Tyr
            20                  25                  30
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Ile
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60

Lys Gly Arg Ala Thr Leu Thr Ala Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Phe Cys
85 90 95
Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
100 105 110
Val Thr Val Ser Ser
115

<210> 22
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 22
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tcctgcaagg cctccggcta caccttcacc tcctactaca tccactgggt gcgccaggcc 120
cccggccagg gcctggagtg gatgggctgg atctaccccg gctccggcaa caccaagtac 180
tccgagaagt tcaagggccg cgccaccatg accgccgaca cctccacctc caccgcctac 240
atggagctgc gctccctgcg ctccgacgac accgccgtgt actactgcgc ccgcgacggc 300
tgctacggct tcgcctactg gggccagggc accctggtga ccgtgtcctc a 351

<210> 23
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 23
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
1 5 10 15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
20 25 30
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
35 40 45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
50 55 60
Lys Gly Arg Ala Thr Met Thr Ala Asp Thr Ser Thr Ser Thr Ala Tyr
65 70 75 80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
85 90 95
Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
100 105 110
Val Thr Val Ser Ser
115

<210> 24
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

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tcctgcaagg cctccggcta ctccttcacc tcctactaca tccactgggt gcgccaggcc 120
cccggccagg gcctggagtg gatcggctgg atctaccccg gctccggcaa caccaagtac 180
tccgagaagt tcaagggccg cgccaccctg accgccgaca cctccacctc caccgcctac 240
atggagctgc gctccctgcg ctccgacgac accgccgtgt acttctgcgc ccgcgacggc 300
tcctacggct tcgcctactg gggccagggc accctggtga ccgtgtcctc a 351

<210> 25
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

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


<210> 26
<211> 351
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

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tcctgcaagg cctccggcta caccttcacc tcctactaca tccactgggt gcgccaggcc 120
cccggccagg gcctggagtg gatgggctgg atctaccccg gctccggcaa caccaagtac 180
tccgagaagt tcaagggccg cgccaccatg accgccgaca cctccacctc caccgcctac 240
atggagctgc gctccctgcg ctccgacgac accgccgtgt actactgcgc ccgcgacggc 300
tcctacggct tcgcctactg gggccagggc accctggtga ccgtgtcctc a          351

<210> 27
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 27
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
 1               5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60
Lys Gly Arg Ala Thr Met Thr Ala Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Asp Gly Ser Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser

115

<210> 28
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 28
atggagttcg gcctgtcctg gctgttcctg gtggccatcc tgaagggcgt gcagtgc 57

<210> 29
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 29
Met Glu Phe Gly Leu Ser Trp Leu Phe Leu Val Ala Ile Leu Lys Gly
1 5 10 15
Val Gln Cys

<210> 30
<211> 57
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 30
atggactgga cctggagcat ccttttcttg gtggcagcag caacaggtgc ccactcc 57

<210> 31
<211> 19
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 31
Met Asp Trp Thr Trp Ser Ile Leu Phe Leu Val Ala Ala Ala Thr Gly
1 5 10 15
Ala His Ser

<210> 32
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 32
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atcacctgca aggcctccca gtccgtggac tacgacggcg actcctacat gaactggtac 120
cagcagaagc ccggcaaggc ccccaagttc ctgatctgcg ccgcctccaa cctggagtcc 180
ggcgtgcccct cccgcttctc cggctccggc tccggcaccg acttcaccct gaccatctcc 240

tccctgcagc ccgaggacgc cgccacctac tactgccagc agtccaacga ggacccttc 300
accttcggcc agggcaccaa gctggagatc aag 333

<210> 33
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 33
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1               5                  10                  15
Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
            20                  25                  30
Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
        35                  40                  45
Lys Phe Leu Ile Cys Ala Ala Ser Asn Leu Glu Ser Gly Val Pro Ser
    50                  55                  60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65                  70                  75                  80
Ser Leu Gln Pro Glu Asp Ala Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
                85                  90                  95
Glu Asp Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110


<210> 34
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 34
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atcacctgca aggcctccca gtccgtggac tacgacggcg actcctacat gaactggtac 120
cagcagaagc ccggcaaggc ccccaagttc ctgatctacg ccgcctccaa cctggagtcc 180
ggcgtgcccc cccgcttctc cggctccggc tccggcaccg acttcaccct gaccatctcc 240
tccctgcagc ccgaggacgc cgccacctac tactgccagc agtccaacga ggacccttc 300
accttcggcc agggcaccaa gctggagatc aag 333

<210> 35
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

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

<210> 36
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 36
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atcacctgca aggcctccca gtccgtggac tacgacggcg actcctacat gaactggtac 120
cagcagaagc ccggcaaggc ccccaagttc ctgatctgcg ccgcctccaa cctggagtcc 180
ggcgtgcccc cccgcttctc cggctccggc tccggcaccg acttcaccct gaccatctcc 240
tccctgcagc ccgaggactt cgccacctac tactgccagc agtccaacga ggacccccttc 300
accttcggcc agggcaccaa gctggagatc aag 333

<210> 37
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 37
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1               5                  10                  15
Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
            20                  25                  30
Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
        35                  40                  45
Lys Phe Leu Ile Cys Ala Ala Ser Asn Leu Glu Ser Gly Val Pro Ser
    50                  55                  60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65                  70                  75                  80
Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
                85                  90                  95
Glu Asp Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110


<210> 38
<211> 333
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 38
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atcacctgca aggcctccca gtccgtggac tacgacggcg actcctacat gaactggtac 120
cagcagaagc ccggcaaggc ccccaagttc ctgatctacg ccgcctccaa cctggagtcc 180
ggcgtgcccc cccgcttctc cggctccggc tccggcaccg acttcaccct gaccatctcc 240
tccctgcagc ccgaggactt cgccacctac tactgccagc agtccaacga ggacccccttc 300
accttcggcc agggcaccaa gctggagatc aag 333

<210> 39
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 39
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly

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


<210> 40
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 40
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tccggc                                                             66

<210> 41
<211> 22
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 41
Met Asp Met Arg Val Pro Ala Gln Leu Leu Gly Leu Leu Met Leu Trp
 1               5                  10                  15
Val Ser Gly Ser Ser Gly
            20


<210> 42
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 42
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
 1               5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Phe
            20                  25                  30
Gly Ile Ser Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
Gly Trp Ile Ser Pro Tyr Asn Gly Asp Thr Asn Tyr Ala Gln Asn Leu
    50                  55                  60
Gln Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Asp Arg Gly Ser Met Ser Asp Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser
        115
```

<210> 43
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 43
Asp Ile Gln Leu 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 Asp
            20                  25                  30
Leu Gly Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys Leu Leu Ile
        35                  40                  45
Tyr Ala Ala Ser Ser 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 Leu Gln Asp Tyr Asn Tyr Pro Pro
                85                  90                  95
Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105


<210> 44
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 44
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
 1               5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr Ser Tyr
            20                  25                  30
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60
Lys Gly Arg Val Thr Met Thr Thr Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser
        115


<210> 45
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

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

Lys Leu Leu Ile Tyr Ala Ala Ser Asn Leu Glu Ser Gly Val Pro Ser
50 55 60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65 70 75 80
Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
85 90 95
Glu Asp Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
100 105 110

<210> 46
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<220>
<221> VARIANT
<222> 11
<223> Xaa is Val or Leu

<220>
<221> VARIANT
<222> 28
<223> Xaa is Ser or Thr

<220>
<221> VARIANT
<222> 38
<223> Xaa is Arg or Lys

<220>
<221> VARIANT
<222> 48
<223> Xaa is Met or Ile

<220>
<221> VARIANT
<222> 68
<223> Xaa is Val or Ala

<220>
<221> VARIANT
<222> 70
<223> Xaa is Met or Leu

<220>
<221> VARIANT
<222> 72
<223> Xaa is Thr or Ala

<220>
<221> VARIANT
<222> 95
<223> Xaa is Cys or Ser

<400> 46
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Xaa Lys Lys Pro Gly Ala
1 5 10 15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Xaa Phe Thr Ser Tyr
20 25 30
Tyr Ile His Trp Val Xaa Gln Ala Pro Gly Gln Gly Leu Glu Trp Xaa

```
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60
Lys Gly Arg Xaa Thr Xaa Thr Xaa Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Xaa Cys
                85                  90                  95
Ala Arg Asp Gly Xaa Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser
        115


<210> 47
<211> 111
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<220>
<221> VARIANT
<222> 50
<223> Xaa is Leu or Phe

<220>
<221> VARIANT
<222> 53
<223> Xaa is Tyr or Cys

<220>
<221> VARIANT
<222> 87
<223> Xaa is Phe or Ala

<400> 47
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1               5                  10                  15
Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
            20                  25                  30
Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
        35                  40                  45
Lys Xaa Leu Ile Xaa Ala Ala Ser Asn Leu Glu Ser Gly Val Pro Ser
    50                  55                  60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65                  70                  75                  80
Ser Leu Gln Pro Glu Asp Xaa Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
                85                  90                  95
Glu Asp Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys
            100                 105                 110


<210> 48
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<220>
<221> VARIANT
<222> 3
<223> Xaa is Cys or Met or Ser or Thr

<400> 48
Asp Gly Xaa Tyr Gly Phe Ala Tyr
```

1 5

<210> 49
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 49
Arg Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu
1 5 10 15
Gln Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe
20 25 30
Tyr Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln
35 40 45
Ser Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser
50 55 60
Thr Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu
65 70 75 80
Lys His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser
85 90 95
Pro Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 50
<211> 330
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

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

245 250 255
Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn
260 265 270
Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser Asp Gly Ser Phe Phe
275 280 285
Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn
290 295 300
Val Phe Ser Cys Ser Val Met His Glu Ala Leu His Asn His Tyr Thr
305 310 315 320
Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
325 330

<210> 51
<211> 106
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 51
Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
1 5 10 15
Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
20 25 30
Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
35 40 45
Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
50 55 60
Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
65 70 75 80
His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
85 90 95
Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
100 105

<210> 52
<211> 330
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 52
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Ser Ser Lys
1 5 10 15
Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
20 25 30
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
50 55 60
Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser Leu Gly Thr Gln Thr
65 70 75 80
Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95
Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro Cys
100 105 110
Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro Pro
115 120 125
Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys
130 135 140
Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn Trp
145 150 155 160
Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu

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


<210> 53
<211> 218
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 53
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1                  5                  10                  15
Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
            20                  25                  30
Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
        35                  40                  45
Lys Phe Leu Ile Cys Ala Ala Ser Asn Leu Glu Ser Gly Val Pro Ser
    50                  55                  60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65                  70                  75                  80
Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
                85                  90                  95
Glu Asp Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Arg
            100                 105                 110
Thr Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln
        115                 120                 125
Leu Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr
    130                 135                 140
Pro Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser
145                 150                 155                 160
Gly Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr
                165                 170                 175
Tyr Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys
            180                 185                 190
His Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro
        195                 200                 205
Val Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215


<210> 54
<211> 217
<212> PRT
<213> Artificial Sequence

<220>
```

<223> Synthesized

<400> 54
Asp Ile Gln Leu Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
 1               5                  10                  15
Asp Arg Val Thr Ile Thr Cys Lys Ala Ser Gln Ser Val Asp Tyr Asp
            20                  25                  30
Gly Asp Ser Tyr Met Asn Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro
        35                  40                  45
Lys Phe Leu Ile Cys Ala Ala Ser Asn Leu Glu Ser Gly Val Pro Ser
    50                  55                  60
Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser
65                  70                  75                  80
Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Ser Asn
                85                  90                  95
Glu Asp Pro Phe Thr Phe Gly Gln Gly Thr Lys Leu Glu Ile Lys Thr
            100                 105                 110
Val Ala Ala Pro Ser Val Phe Ile Phe Pro Pro Ser Asp Glu Gln Leu
        115                 120                 125
Lys Ser Gly Thr Ala Ser Val Val Cys Leu Leu Asn Asn Phe Tyr Pro
    130                 135                 140
Arg Glu Ala Lys Val Gln Trp Lys Val Asp Asn Ala Leu Gln Ser Gly
145                 150                 155                 160
Asn Ser Gln Glu Ser Val Thr Glu Gln Asp Ser Lys Asp Ser Thr Tyr
                165                 170                 175
Ser Leu Ser Ser Thr Leu Thr Leu Ser Lys Ala Asp Tyr Glu Lys His
            180                 185                 190
Lys Val Tyr Ala Cys Glu Val Thr His Gln Gly Leu Ser Ser Pro Val
        195                 200                 205
Thr Lys Ser Phe Asn Arg Gly Glu Cys
    210                 215


<210> 55
<211> 447
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 55
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
 1               5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60
Lys Gly Arg Ala Thr Met Thr Ala Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205

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Thr Lys Val Asp Lys Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His
    210                 215                 220
Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val
225                 230                 235                 240
Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
                245                 250                 255
Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
            260                 265                 270
Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Val Lys
        275                 280                 285
Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser
    290                 295                 300
Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305                 310                 315                 320
Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile
                325                 330                 335
Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
            340                 345                 350
Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
        355                 360                 365
Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
    370                 375                 380
Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
385                 390                 395                 400
Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg
                405                 410                 415
Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
            420                 425                 430
His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
        435                 440                 445


<210> 56
<211> 447
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 56
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
 1                  5                  10                  15
Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser Tyr
            20                  25                  30
Tyr Ile His Trp Val Arg Gln Ala Pro Gly Gln Gly Leu Glu Trp Met
        35                  40                  45
Gly Trp Ile Tyr Pro Gly Ser Gly Asn Thr Lys Tyr Ser Glu Lys Phe
    50                  55                  60
Lys Gly Arg Ala Thr Met Thr Ala Asp Thr Ser Thr Ser Thr Ala Tyr
65                  70                  75                  80
Met Glu Leu Arg Ser Leu Arg Ser Asp Asp Thr Ala Val Tyr Tyr Cys
                85                  90                  95
Ala Arg Asp Gly Cys Tyr Gly Phe Ala Tyr Trp Gly Gln Gly Thr Leu
            100                 105                 110
Val Thr Val Ser Ser Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu
        115                 120                 125
Ala Pro Ser Ser Lys Ser Thr Ser Gly Gly Thr Ala Ala Leu Gly Cys
    130                 135                 140
Leu Val Lys Asp Tyr Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser
145                 150                 155                 160
Gly Ala Leu Thr Ser Gly Val His Thr Phe Pro Ala Val Leu Gln Ser
                165                 170                 175
Ser Gly Leu Tyr Ser Leu Ser Ser Val Val Thr Val Pro Ser Ser Ser
            180                 185                 190
Leu Gly Thr Gln Thr Tyr Ile Cys Asn Val Asn His Lys Pro Ser Asn
        195                 200                 205
Thr Lys Val Asp Lys Arg Val Glu Pro Lys Ser Cys Asp Lys Thr His
```

210 215 220
Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val
225 230 235 240
Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr
245 250 255
Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu
260 265 270
Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys
275 280 285
Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg Val Val Ser
290 295 300
Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys Glu Tyr Lys
305 310 315 320
Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu Lys Thr Ile
325 330 335
Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr Thr Leu Pro
340 345 350
Pro Ser Arg Glu Glu Met Thr Lys Asn Gln Val Ser Leu Thr Cys Leu
355 360 365
Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp Glu Ser Asn
370 375 380
Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val Leu Asp Ser
385 390 395 400
Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp Lys Ser Arg
405 410 415
Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His Glu Ala Leu
420 425 430
His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro Gly Lys
435 440 445

<210> 57
<211> 326
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 57
Ala Ser Thr Lys Gly Pro Ser Val Phe Pro Leu Ala Pro Cys Ser Arg
1 5 10 15
Ser Thr Ser Glu Ser Thr Ala Ala Leu Gly Cys Leu Val Lys Asp Tyr
20 25 30
Phe Pro Glu Pro Val Thr Val Ser Trp Asn Ser Gly Ala Leu Thr Ser
35 40 45
Gly Val His Thr Phe Pro Ala Val Leu Gln Ser Ser Gly Leu Tyr Ser
50 55 60
Leu Ser Ser Val Val Thr Val Pro Ser Ser Asn Phe Gly Thr Gln Thr
65 70 75 80
Tyr Thr Cys Asn Val Asp His Lys Pro Ser Asn Thr Lys Val Asp Lys
85 90 95
Thr Val Glu Arg Lys Cys Cys Val Glu Cys Pro Pro Cys Pro Ala Pro
100 105 110
Pro Val Ala Gly Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp
115 120 125
Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp
130 135 140
Val Ser His Glu Asp Pro Glu Val Gln Phe Asn Trp Tyr Val Asp Gly
145 150 155 160
Val Glu Val His Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Phe Asn
165 170 175
Ser Thr Phe Arg Val Val Ser Val Leu Thr Val Val His Gln Asp Trp
180 185 190
Leu Asn Gly Lys Glu Tyr Lys Cys Lys Val Ser Asn Lys Gly Leu Pro
195 200 205
Ala Pro Ile Glu Lys Thr Ile Ser Lys Thr Lys Gly Gln Pro Arg Glu
210 215 220

```
Pro Gln Val Tyr Thr Leu Pro Pro Ser Arg Glu Glu Met Thr Lys Asn
225                 230                 235                 240
Gln Val Ser Leu Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile
                245                 250                 255
Ala Val Glu Trp Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr
            260                 265                 270
Thr Pro Pro Met Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys
        275                 280                 285
Leu Thr Val Asp Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys
    290                 295                 300
Ser Val Met His Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu
305                 310                 315                 320
Ser Leu Ser Pro Gly Lys
                325
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<210> 58
<211> 330
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthesized

<400> 58

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