SEQUENCE LISTING

<110> BOARD OF REGENTS, THE UNIVERSITY OF TEXAS SYSTEM

<120> ANTI-HUMAN SEMA4A ANTIBODIES USEFUL TO TREAT DISEASE

<130> 07P60WO (MDA11-099)

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<150> 61/543,877
<151> 2011-10-06

<160> 77

<170> PatentIn version 3.5

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Ser His Thr Met His
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Val His Ser Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg

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Pro Gly Ala Ser Val Lys Met Ser Cys Lys Ala Ser Gly Tyr Thr Phe
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Thr Ser His Thr Met His Trp Val Lys Gln Arg Pro Gly Gln Gly Leu
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Glu Trp Ile Gly Tyr Ile Asn Pro Ser Ser Gly Tyr Thr Asn Tyr Asn
65 70 75 80

Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser
85 90 95

Thr Ala Tyr Met Gln Leu Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
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Tyr Ile Ser Ser Leu His Ser
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Gln Gln Tyr Ser Lys Leu Pro Tyr Thr
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Ala Ser Leu Gly Asp Arg Val Thr Ile Ser Cys Ser Ala Ser Gln Gly
35 40 45

Ile Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Asp Gly Thr Val
50 55 60

Lys Leu Leu Ile Tyr Tyr Ile Ser Ser Leu His Ser Gly Val Thr Ser
65 70 75 80

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser
85 90 95

Asn Leu Glu Pro Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser
100 105 110

Lys Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
115 120 125

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<400> 10

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Gly

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Pro Gly Ala Ser Val Lys Ile Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met Asp Trp Val Lys Gln Ser His Gly Lys Ser Leu
50 55 60

Glu Trp Ile Gly Asp Ile Asn Pro Lys Tyr Asp Ser Thr Thr Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Glu Arg Gly Ser Tyr Asp Tyr Asp Gly Thr Pro
115 120 125

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

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gagctccgca gcctgacatc tgaggacact gcagtctatt actgtgcaag agagaggggc 360

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Ala

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Trp Ala Ser Thr Arg Glu Ser
1 5

<210> 18
<211> 9
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<213> Mus sp.

<400> 18
Gln Gln Tyr Tyr Thr Tyr Pro Arg Thr
1 5

<210> 19
<211> 133
<212> PRT
<213> Mus sp.

<400> 19
Met Asp Ser Gln Ala Gln Val Leu Met Leu Leu Leu Leu Trp Val Ser
1 5 10 15

Gly Thr Cys Gly Asp Ile Val Met Ser Gln Ser Pro Ser Ser Leu Ala
20 25 30

Val Ser Val Gly Glu Lys Val Thr Met Ser Cys Lys Ser Ser Gln Ser
35 40 45

Leu Leu Tyr Ser Ser Asn Arg Lys Asn Tyr Leu Ala Trp Tyr Gln Gln
50 55 60

Lys Pro Gly Gln Ser Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg
65 70 75 80

Glu Ser Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp
85 90 95

Phe Thr Leu Thr Ile Ser Ser Val Lys Ala Glu Asp Leu Ala Val Tyr
100 105 110

Tyr Cys Gln Gln Tyr Tyr Thr Tyr Pro Arg Thr Phe Gly Gly Gly Thr
115 120 125

Lys Leu Glu Ile Lys
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<210> 22
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Glu Ile Asn Pro Ser Asn Gly Arg Thr Asp Tyr Asn Glu Lys Phe Lys
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Ser

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<400> 23
Gly Leu Asp Tyr Phe Asp Tyr
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<210> 24
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<400> 24
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Pro Gly Ala Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

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

Glu Trp Ile Gly Glu Ile Asn Pro Ser Asn Gly Arg Thr Asp Tyr Asn
65 70 75 80

Glu Lys Phe Lys Ser Lys Ala Ile Met Ile Val Asp Lys Ser Ser Ser
85 90 95

Thr Ala Tyr Met Gln Phe Ser Ser Leu Thr Ser Glu Asp Ser Ala Val
100 105 110

Tyr Tyr Cys Ala Gly Gly Leu Asp Tyr Phe Asp Tyr Trp Gly Gln Gly
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Thr Thr Leu Thr Val Ser Ser
130 135

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<212> DNA
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ggacaaggcc ttgagtggat tggagagatt aatcctagca acggtcgtac tgactacaat 240

gagaagttca agagcaaggc cataatgatt gtagacaaat cttctagcac agcctatatg 300

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tactttgact attggggcca aggcaccact ctcacagtct cctca 405

<210> 26
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<400> 26
Lys Ala Ser Glu Asn Val Gly Thr Tyr Val Ser

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Gly Ala Ser Asn Arg Tyr Thr
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<210> 28
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<400> 28
Gly Gln Ser Tyr Ser Tyr Pro Phe Thr
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<210> 29
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<400> 29
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Met Ser Val Gly Glu Arg Val Thr Leu Ser Cys Lys Ala Ser Glu Asn
35 40 45

Val Gly Thr Tyr Val Ser Trp Tyr Gln Gln Lys Pro Asp Gln Ser Pro
50 55 60

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

Arg Phe Thr Gly Ser Gly Ser Ala Thr Asp Phe Thr Leu Thr Ile Ser
85 90 95

Ser Val Gln Ala Glu Asp Leu Ala Asp Tyr His Cys Gly Gln Ser Tyr
100 105 110

Ser Tyr Pro Phe Thr Phe Gly Ser Gly Thr Ser Leu Glu Ile Lys
115 120 125

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<211> 381

<212> DNA
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<213> Mus sp.

<400> 32
Leu Val Ser Lys Leu Asp Ser
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<210> 33
<211> 9
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<400> 33
Cys Gln Gly Thr His Phe Pro Phe Thr
1 5

<210> 34
<211> 132
<212> PRT
<213> Mus sp.

<400> 34
Met Met Ser Pro Ala Gln Phe Leu Phe Leu Leu Val Leu Trp Ile Arg
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Glu Ala Asn Gly Ala Val Val Met Thr Gln Thr Pro Leu Thr Leu Ser
20 25 30

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

Leu Leu Asp Arg Asp Gly Lys Thr Tyr Leu Asn Trp Leu Leu Gln Arg
50 55 60

Pro Gly Gln Ser Pro Lys Arg Leu Ile Tyr Leu Val Ser Lys Leu Asp
65 70 75 80

Ser Gly Val Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe
85 90 95

Thr Leu Lys Ile Ser Arg Val Glu Ala Glu Asp Leu Gly Val Tyr Tyr
100 105 110

Cys Cys Gln Gly Thr His Phe Pro Phe Thr Phe Gly Ser Gly Thr Lys
115 120 125

Leu Glu Ile Lys
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<211> 396
<212> DNA
<213> Mus sp.

<400> 35
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<223> Description of Artificial Sequence: Synthetic peptide

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<210> 37
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 37
Tyr Ile Asn Pro Ser Ser Gly Tyr Thr Asn Tyr Asn Gln Lys Phe Lys
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Asp

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

<220>
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<400> 38
Trp Asp Tyr Val Ala Leu Asp Tyr
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<210> 39
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<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 39
Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys Pro Gly Ala
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Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe Thr Ser His
20 25 30

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

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

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

Val Thr Val Ser Ser
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<210> 40
<211> 443
<212> DNA
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<223> Description of Artificial Sequence: Synthetic polynucleotide

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ggtgagtctg tgtactgaag ctt 443

<210> 41
<211> 136
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 41
Met Glu Arg His Trp Ile Phe Leu Phe Leu Leu Ser Val Thr Ala Gly
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Val His Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Ser His Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Arg Leu
50 55 60

Glu Trp Ile Gly Tyr Ile Asn Pro Ser Ser Gly Tyr Thr Asn Tyr Asn
65 70 75 80

Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Ala Asp Thr Ser Ala Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Trp Asp Tyr Val Ala Leu Asp Tyr Trp Gly Gln
115 120 125

Gly Thr Leu Val Thr Val Ser Ser
130 135

<210> 42
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 42
Ser His Thr Met His
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<210> 43
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 43
Tyr Ile Asn Pro Ser Ser Gly Tyr Thr Asn Tyr Asn Gln Lys Phe Lys
1 5 10 15

Asp

<210> 44
<211> 8
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 44

Trp Asp Tyr Val Ala Leu Asp Tyr
1 5

<210> 45
<211> 117
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 45
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 His
20 25 30

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

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

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

Val Thr Val Ser Ser
115

<210> 46
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<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

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cgccaggccc ccggacaaag gcttgagtgg attggataca ttaatcctag cagtggttat 240

actaattaca atcagaagtt caaggacaga gccaccctta ccgccgacac atccgccagc 300

acagcctaca tggagctgag cagcctgaga tctgaagaca ccgctgtgta ttactgtgcc 360

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ggtgagtctg tgtactgaag ctt 443

<210> 47
<211> 136
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 47
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1 5 10 15

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

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Ser His Thr Met His Trp Val Arg Gln Ala Pro Gly Gln Arg Leu
50 55 60

Glu Trp Ile Gly Tyr Ile Asn Pro Ser Ser Gly Tyr Thr Asn Tyr Asn
65 70 75 80

Gln Lys Phe Lys Asp Arg Ala Thr Leu Thr Ala Asp Thr Ser Ala Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Trp Asp Tyr Val Ala Leu Asp Tyr Trp Gly Gln
115 120 125

Gly Thr Leu Val Thr Val Ser Ser
130 135

<210> 48
<211> 11
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic

peptide

<400> 48
Ser Ala Ser Gln Gly Ile Ser Asn Tyr Leu Asn
1 5 10

<210> 49
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 49
Tyr Ile Ser Ser Leu His Ser
1 5

<210> 50
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 50
Gln Gln Tyr Ser Lys Leu Pro Tyr Thr
1 5

<210> 51
<211> 107
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 51
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 Ser Ala Ser Gln Gly Ile Ser Asn Tyr
20 25 30

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

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

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

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

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

<210> 52
<211> 415
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

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agagtcacca tcacttgcag tgcaagtcag ggcattagca attatctgaa ctggtatcag 180

cagaaaccag ggaaagttcc taagctcctg atctattaca tctcaagtct gcactcaggg 240

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ctgcagcctg aagatgttgc aacttattac tgtcaacagt atagtaagct gccgtacacc 360

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<210> 53
<211> 126
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 53
Met Ser Ser Ala Gln Phe Leu Gly Leu Leu Leu Leu Cys Phe Gln Gly
1 5 10 15

Thr Arg Cys Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala
20 25 30

Ser Val Gly Asp Arg Val Thr Ile Thr Cys Ser Ala Ser Gln Gly Ile
35 40 45

Ser Asn Tyr Leu Asn Trp Tyr Gln Gln Lys Pro Gly Lys Val Pro Lys
50 55 60

Leu Leu Ile Tyr Tyr Ile Ser Ser Leu His Ser Gly Val Pro Ser Arg
65 70 75 80

Phe Ser Gly Ser Gly Ser Gly Thr Asp Tyr Thr Leu Thr Ile Ser Ser
85 90 95

Leu Gln Pro Glu Asp Val Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Lys
100 105 110

Leu Pro Tyr Thr Phe Gly Gly Gly Thr Lys Val Glu Ile Lys
115 120 125

<210> 54
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 54
Asp Tyr Asn Met Asp
1 5

<210> 55
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 55
Asp Ile Asn Pro Lys Tyr Asp Ser Thr Thr Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 56
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 56
Glu Arg Gly Ser Tyr Asp Tyr Asp Gly Thr Pro Tyr Ala Met Asp Tyr
1 5 10 15

<210> 57
<211> 125
<212> PRT

<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 57

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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 Asp Tyr
            20                  25                  30

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

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

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

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
        115                 120                 125
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<210> 58
<211> 468
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 58

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actagtacca ccatggaatg gagctggatc tttctctttc tcctgtcagg aactgcaggc       60

gtcctctctc aggtccagct tgtgcagtct ggggctgaag tgaagaagcc tggggcctca      120

gtgaaagttt cctgcaaggc ttctggatac accttcactg actacaacat ggactgggtg      180

cgccaggccc ccggacaaag gcttgagtgg attggagata ttaatcctaa gtatgatagt      240

actacctaca accagaagtt caagggaaag gccaccctta ccgcagacac atccgccagc      300

acagcctaca tggagctcag cagcctgaga tctgaagaca ccgctgtgta ttactgtgcc      360

agggagaggg gctcctatga ttacgacggg actccctatg ctatggacta ctggggccag      420
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ggaaccctgg tcaccgtctc ctcaggtgag tctgctgtac tgaagctt 468

<210> 59
<211> 144
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 59
Met Glu Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met Asp Trp Val Arg Gln Ala Pro Gly Gln Arg Leu
50 55 60

Glu Trp Ile Gly Asp Ile Asn Pro Lys Tyr Asp Ser Thr Thr Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Lys Ala Thr Leu Thr Ala Asp Thr Ser Ala Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Glu Arg Gly Ser Tyr Asp Tyr Asp Gly Thr Pro
115 120 125

Tyr Ala Met Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
130 135 140

<210> 60
<211> 5
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 60
Asp Tyr Asn Met Asp
1 5

<210> 61
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 61
Asp Ile Asn Pro Lys Tyr Asp Ser Thr Thr Tyr Asn Gln Lys Phe Lys
1 5 10 15

Gly

<210> 62
<211> 16
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 62
Glu Arg Gly Ser Tyr Asp Tyr Asp Gly Thr Pro Tyr Ala Met Asp Tyr
1 5 10 15

<210> 63
<211> 125
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 63
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 Asp Tyr
20 25 30

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

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

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

Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
115 120 125

<210> 64
<211> 468
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 64
actagtacca ccatggaatg gagctggatc tttctctttc tcctgtcagg aactgcaggc 60

gtcctctctc aggtccagct tgtgcagtct ggggctgaag tgaagaagcc tggggcctca 120

gtgaaagttt cctgcaaggc ttctggatac accttcactg actacaacat ggactgggtg 180

cgccaggccc ccggacaaag gcttgagtgg attggagata ttaatcctaa gtatgatagt 240

actacctaca accagaagtt caagggaaga gccaccctta ccgcagacac atccgccagc 300

acagcctaca tggagctcag cagcctgaga tctgaagaca ccgctgtgta ttactgtgcc 360

agggagaggg gctcctatga ttacgacggg actccctatg ctatggacta ctggggccag 420

ggaaccctgg tcaccgtctc ctcaggtgag tctgctgtac tgaagctt 468

<210> 65
<211> 144
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 65
Met Glu Trp Ser Trp Ile Phe Leu Phe Leu Leu Ser Gly Thr Ala Gly
1 5 10 15

Val Leu Ser Gln Val Gln Leu Val Gln Ser Gly Ala Glu Val Lys Lys
20 25 30

Pro Gly Ala Ser Val Lys Val Ser Cys Lys Ala Ser Gly Tyr Thr Phe
35 40 45

Thr Asp Tyr Asn Met Asp Trp Val Arg Gln Ala Pro Gly Gln Arg Leu
50 55 60

Glu Trp Ile Gly Asp Ile Asn Pro Lys Tyr Asp Ser Thr Thr Tyr Asn
65 70 75 80

Gln Lys Phe Lys Gly Arg Ala Thr Leu Thr Ala Asp Thr Ser Ala Ser
85 90 95

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

Tyr Tyr Cys Ala Arg Glu Arg Gly Ser Tyr Asp Tyr Asp Gly Thr Pro
115 120 125

Tyr Ala Met Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser Ser
130 135 140

<210> 66
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 66
Lys Ser Ser Gln Ser Leu Leu Tyr Ser Ser Asn Arg Lys Asn Tyr Leu
1 5 10 15

Ala

<210> 67
<211> 7
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 67
Trp Ala Ser Thr Arg Glu Ser
1 5

<210> 68
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic peptide

<400> 68

Gln Gln Tyr Tyr Thr Tyr Pro Arg Thr
1 5

<210> 69
<211> 113
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 69
Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala Val Ser Leu Gly
1 5 10 15

Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser Leu Leu Tyr Ser
20 25 30

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

Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

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

Ile Ser Ser Leu Gln Ala Glu Asp Val Ala Val Tyr Tyr Cys Gln Gln
85 90 95

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

Lys

<210> 70
<211> 435
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polynucleotide

<400> 70
gctagcacca ccatggattc acaggcccag gttcttatgt tgctgctgct ctgggtgtct 60

gggacctgtg gggacatcgt gatgacccag tctccagact ccctggctgt gtctctgggc 120

gagagggcca ccatcaactg caagtccagc cagagtcttc tgtacagctc caaccgcaag 180

aactacctgg cttggtacca gcagaaacca ggacagcctc ctaagttgct catttactgg 240

gcatctaccc gggaatccgg ggtccctgac cgattcagtg gcagcgggtc tgggacagat 300

ttcactctca ccatcagcag cctgcaggct gaagatgtgg cagtttatta ctgtcagcaa 360

tattatacct atcctcggac cttcggccaa gggaccaaag tggaaatcaa acgtgagtag 420

aatttaaacg aattc 435

<210> 71
<211> 133
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Synthetic polypeptide

<400> 71
Met Asp Ser Gln Ala Gln Val Leu Met Leu Leu Leu Leu Trp Val Ser
1 5 10 15

Gly Thr Cys Gly Asp Ile Val Met Thr Gln Ser Pro Asp Ser Leu Ala
20 25 30

Val Ser Leu Gly Glu Arg Ala Thr Ile Asn Cys Lys Ser Ser Gln Ser
35 40 45

Leu Leu Tyr Ser Ser Asn Arg Lys Asn Tyr Leu Ala Trp Tyr Gln Gln
50 55 60

Lys Pro Gly Gln Pro Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg
65 70 75 80

Glu Ser Gly Val Pro Asp Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp
85 90 95

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

Tyr Cys Gln Gln Tyr Tyr Thr Tyr Pro Arg Thr Phe Gly Gln Gly Thr
115 120 125

Lys Val Glu Ile Lys
130

<210> 72
<211> 117
<212> PRT
<213> Mus sp.

<400> 72
Gln Val Gln Leu Gln Gln Ser Gly Ala Glu Leu Ala Arg Pro Gly Ala

1 5 10 15

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

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

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

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

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

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

Val Thr Val Ser Ser
115

<210> 73
<211> 107
<212> PRT
<213> Mus sp.

<400> 73
Glu Ile Gln Met Thr Gln Thr Thr Ser Ser Leu Ser Ala Ser Leu Gly
1 5 10 15

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

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

Tyr Tyr Ile Ser Ser Leu His Ser Gly Val Thr Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Tyr Ser Leu Thr Ile Ser Asn Leu Glu Pro
65 70 75 80

Glu Asp Ile Ala Thr Tyr Tyr Cys Gln Gln Tyr Ser Lys Leu Pro Tyr
85 90 95

Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile Lys
100 105

<210> 74
<211> 125
<212> PRT
<213> Mus sp.

<400> 74
Glu Val Gln Leu Gln Gln Phe Gly Ala Glu Leu Val Lys Pro Gly Ala
1 5 10 15

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

Asn Met Asp Trp Val Lys Gln Ser His Gly Lys Ser Leu Glu Trp Ile
35 40 45

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

Lys Gly Lys Ala Thr Leu Thr Ala Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

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

Ala Arg Glu Arg Gly Ser Tyr Asp Tyr Asp Gly Thr Pro Tyr Ala Met
100 105 110

Asp Tyr Trp Gly Gln Gly Thr Ser Val Thr Val Ser Ser
115 120 125

<210> 75
<211> 113
<212> PRT
<213> Mus sp.

<400> 75
Asp Ile Val Met Ser Gln Ser Pro Ser Ser Leu Ala Val Ser Val Gly
1 5 10 15

Glu Lys Val Thr Met Ser Cys Lys Ser Ser Gln Ser Leu Leu Tyr Ser
20 25 30

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

Ser Pro Lys Leu Leu Ile Tyr Trp Ala Ser Thr Arg Glu Ser Gly Val
50 55 60

Pro Asp Arg Phe Thr Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr

65 70 75 80

Ile Ser Ser Val Lys Ala Glu Asp Leu Ala Val Tyr Tyr Cys Gln Gln
85 90 95

Tyr Tyr Thr Tyr Pro Arg Thr Phe Gly Gly Gly Thr Lys Leu Glu Ile
100 105 110

Lys

<210> 76
<211> 116
<212> PRT
<213> Mus sp.

<400> 76
Gln Val Gln Leu Gln Gln Pro Gly Ala Glu Leu Val Lys Pro Gly Ala
1 5 10 15

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

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

Gly Glu Ile Asn Pro Ser Asn Gly Arg Thr Asp Tyr Asn Glu Lys Phe
50 55 60

Lys Ser Lys Ala Ile Met Ile Val Asp Lys Ser Ser Ser Thr Ala Tyr
65 70 75 80

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

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

Thr Val Ser Ser
115

<210> 77
<211> 107
<212> PRT
<213> Mus sp.

<400> 77
Asn Ile Val Met Thr Gln Ser Pro Lys Ser Met Ser Met Ser Val Gly
1 5 10 15

```
Glu Arg Val Thr Leu Ser Cys Lys Ala Ser Glu Asn Val Gly Thr Tyr
            20                  25                  30

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

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

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

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

Thr Phe Gly Ser Gly Thr Ser Leu Glu Ile Lys
            100                 105
```