

SEQUENCE LISTING

<110> The Board of Trustees of the University of Illinois
Kalyanasundaram, Ramaswamy

<120> Multivalent Vaccine for Filariasis

<130> UIC0030W0

<150> US 61/413,681

<151> 2010-11-15

<150> US 61/449,954

<151> 2011-03-07

<150> US 61/522,079

<151> 2011-08-10

<160> 69

<170> PatentIn version 3.5

<210> 1

<211> 27

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic oligonucleotide

<400> 1

cgcggtatcca tggaagagaa ggtggtg

27

<210> 2

<211> 25

<212> DNA

<213> Artificial sequence

<220>

<223> Synthetic oligonucleotide

<400> 2

ccggaattct cacttgctgt tggtg

25

<210> 3

<211> 12

<212> PRT

<213> Brugia malayi

<400> 3

Trp Ser Ala Glu Gln Trp Asp Trp Pro Leu Gln His

1

5

10

<210> 4

<211> 10
<212> PRT
<213> Brugia malayi

<400> 4

Glu Val Ile Lys Thr Asn Thr Asn Asp Lys
1 5 10

<210> 5
<211> 8
<212> PRT
<213> Brugia malayi

<400> 5

Ser Arg Ala Glu His Tyr Gly Glu
1 5

<210> 6
<211> 11
<212> PRT
<213> Brugia malayi

<400> 6

Lys Leu Pro Ser Asp Val Asp Thr Lys Thr Leu
1 5 10

<210> 7
<211> 9
<212> PRT
<213> Brugia malayi

<400> 7

Phe Thr Pro Lys Glu Ile Glu Val Lys
1 5

<210> 8
<211> 8
<212> PRT
<213> Brugia malayi

<400> 8

Ile Glu Val Lys Val Ala Gly Asp
1 5

<210> 9
<211> 8
<212> PRT
<213> Brugia malayi

<400> 9

Val Gly Leu Asp Ala Ser Phe Phe
1 5

<210> 10

<211> 9

<212> PRT

<213> Brugia malayi

<400> 10

Gly Leu Asp Ala Ser Phe Phe Thr Pro
1 5

<210> 11

<211> 9

<212> PRT

<213> Brugia malayi

<400> 11

Val Lys Val Ala Gly Asp Asn Leu Val
1 5

<210> 12

<211> 9

<212> PRT

<213> Brugia malayi

<400> 12

Lys Leu Pro Ser Asp Val Asp Thr Lys
1 5

<210> 13

<211> 9

<212> PRT

<213> Brugia malayi

<400> 13

Lys Thr Leu Thr Ser Asn Leu Thr Lys
1 5

<210> 14

<211> 9

<212> PRT

<213> Brugia malayi

<400> 14

Val Ile Lys Thr Asn Thr Asn Asp Lys
1 5

<210> 15
<211> 9
<212> PRT
<213> Brugia malayi

<400> 15

Asp Thr Lys Thr Leu Thr Ser Asn Leu
1 5

<210> 16
<211> 9
<212> PRT
<213> Brugia malayi

<400> 16

Phe Phe Thr Pro Lys Glu Ile Glu Val
1 5

<210> 17
<211> 9
<212> PRT
<213> Brugia malayi

<400> 17

Val Gly Leu Asp Ala Ser Phe Phe Thr
1 5

<210> 18
<211> 9
<212> PRT
<213> Brugia malayi

<400> 18

Lys Arg Gly His Leu Val Ile Ala Ala
1 5

<210> 19
<211> 9
<212> PRT
<213> Brugia malayi

<400> 19

Gly Glu Ile Lys Arg Glu Ile Ser Arg
1 5

<210> 20
<211> 9
<212> PRT
<213> Brugia malayi

<400> 20

Ser Phe Phe Thr Pro Lys Glu Ile Glu
1 5

<210> 21
<211> 9
<212> PRT
<213> Brugia malayi

<400> 21

Arg Glu Ile Ser Arg Thr Tyr Lys Leu
1 5

<210> 22
<211> 9
<212> PRT
<213> Brugia malayi

<400> 22

Gly Glu Ile Lys Arg Glu Ile Ser Arg
1 5

<210> 23
<211> 9
<212> PRT
<213> Brugia malayi

<400> 23

Ala Glu His Tyr Gly Glu Ile Lys Arg
1 5

<210> 24
<211> 25
<212> DNA
<213> Artificial sequence

<220>
<223> Synthetic oligonucleotide

<400> 24
ccggaattct cacttgctcgt tgggtg

25

<210> 25

<211> 26
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 25
 cgcggatcca ccgtgatcca ttgtcg 26

<210> 26
 <211> 27
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 26
 aactgcagct gttttccatt tccattc 27

<210> 27
 <211> 30
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 27
 aactgcagat gggtaacaag ctctcatcg 30

<210> 28
 <211> 27
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 28
 cgcggaattcg gcgcactgcc aacctgc 27

<210> 29
 <211> 24
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 29
 cgcggaattca ccatgggtcct ggag 24

<210> 30
 <211> 25
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 30
 gctctagatc agtccttctg gctag 25

 <210> 31
 <211> 26
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 31
 cgggatccat ggaagaaaag gtagtg 26

 <210> 32
 <211> 26
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 32
 ccctcgagtg ctttcttttt ggcagc 26

 <210> 33
 <211> 30
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 33
 ccctcgagat gaataaactt ttaatagcat 30

 <210> 34
 <211> 23
 <212> DNA
 <213> Artificial sequence

 <220>
 <223> Synthetic oligonucleotide

 <400> 34

gggtacccgc gcattgcaa ccc 23

<210> 35
 <211> 29
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> Synthetic oligonucleotide

<400> 35
 ggggtacccc ggcaaggatc aatttaaaa 29

<210> 36
 <211> 28
 <212> DNA
 <213> Artificial sequence
 <220>
 <223> Synthetic oligonucleotide

<400> 36
 cggaattctc aatctttttg agatgaat 28

<210> 37
 <211> 128
 <212> PRT
 <213> Brugia malayi
 <400> 37

Met Asn Lys Leu Leu Ile Ala Phe Gly Leu Val Ile Leu Phe Val Thr
 1 5 10 15

Leu Pro Cys Val Ser Glu Ser Asp Glu Glu Phe Asp Asp Ser Ala Ala
 20 25 30

Asp Asp Thr Asp Asp Ser Glu Ala Gly Gly Gly Ser Glu Gly Gly Asp
 35 40 45

Glu Tyr Val Thr Lys Gly Glu Phe Val Glu Thr Asp Gly Lys Lys Lys
 50 55 60

Glu Cys Ser Ser His Glu Ala Cys Tyr Asp Gln Arg Glu Pro Gln Ala
 65 70 75 80

Trp Cys Arg Leu Ser Glu Asn Gln Ala Trp Thr Asp Arg Gly Cys Phe
 85 90 95

Cys Glu Asp Lys Leu His Ser Cys Val Ile Glu Arg Thr Asn Asn Gly
100 105 110

Lys Leu Glu Tyr Ser Tyr Cys Ala Pro Glu Ala Gly Trp Gln Cys Ala
115 120 125

<210> 38
<211> 572
<212> DNA
<213> Brugia malayi

<400> 38
ggtttattac cccaagtttg agggaggaga aaatgaataa actttttaata gcattcggtt 60
tggttaattct ttttgtgaca ctcccggtgtg tatcagaatc agacgaagag ttcgatgact 120
ccgcagccga tgacaccgac gacagcgagg ccggagggtgg tagtgaagga ggtgatgaat 180
atgtaaccaa aggggaattt gttgaaactg atggcaaaaa gaaagagtgc ttttcgcacg 240
aagcttgcta cgatcaacgt gaaccacaag cgtggtgacg actgagcgag aatcaggcat 300
ggactgacag aggctgcttc tgcgaagata agttgcattc gtgcgtcatc gaaagaacga 360
acaatggtaa attggagtat tcgtactgtg cacctgaagc aggttggcaa tgcgcatagg 420
aatgaatcag tctttgatac taccaacttt ccatccattt cctacacttt tcaaatttaa 480
ttcttttctaa caaataacat ttaactttgg ttttaccgtt attttattaa atattggaaa 540
tatgtgcgac aaaaaaaaaa aaaaaaaaaa aa 572

<210> 39
<211> 126
<212> PRT
<213> Brugia malayi

<400> 39

Met Asn Asn Leu Leu Ile Ala Ile Ser Leu Val Ile Leu Leu Val Ile
1 5 10 15

Phe Pro Ser Lys Ser Asp Leu Glu Ile Asp Asp Ser Ser Asp Ser Asp
20 25 30

Tyr Ala His Ser Asn Asp Asp Asp Tyr Asn Glu Glu Glu Asp Glu Tyr
35 40 45

Thr Thr Lys Gly Glu Phe Val Glu Thr Asp Gly Lys Trp Lys Asn Cys
50 55 60

Ser Ser His Ala Asp Cys Tyr Asp Tyr Arg Glu Pro Ile Ala Trp Cys
65 70 75 80

Lys Pro Thr Ala Asn Gln Phe Trp Thr Asp Lys Gly Cys Phe Cys Glu
85 90 95

Asp Met Leu Tyr Ser Cys Val Ile Glu Arg Thr Asn Asn Gly Lys Leu
100 105 110

Glu Tyr Ser Tyr Cys Thr Ser Lys Glu Asn Trp Gln Cys Leu
115 120 125

<210> 40
<211> 381
<212> DNA
<213> Brugia malayi

<400> 40
atgaataatc tattgatagc aatcagttta gtaattcttc ttgtgatatt cccatcaaaa 60
tcagatttag aaattgatga ttctcagac agtgattatg ctcatagcaa tgacgacgat 120
tacaatgaag aagaagatga atatacgacc aaaggagaat ttgttgaaac tgatggcaaa 180
tggaagaatt gcagttctca tgcagattgc tatgattatc gtgaaccaat agcttggtgc 240
aaaccactg caaatcaatt ttggacagac aaaggttgct tctgtgaaga tatgttgtat 300
tcatgtgtga tcgaaagaac gaacaatggc aaattagaat attcatattg tacatccaaa 360
gaaaactggc aatgtttata a 381

<210> 41
<211> 128
<212> PRT
<213> Wuchereria bancrofti

<400> 41

Met Asn Lys Leu Leu Ile Ala Phe Gly Leu Val Ile Leu Leu Val Thr
1 5 10 15

Leu Pro Cys Ala Ser Glu Ser Asp Glu Glu Phe Asp Asp Gly Ser Asn
20 25 30

Asp Glu Thr Asp Asp Lys Glu Asp Glu Gly Asn Ser Glu Gly Gly Asp
35 40 45

Glu Tyr Val Thr Lys Gly Glu Val Val Glu Thr Asp Gly Lys Lys Lys
50 55 60

Glu Cys Ser Ser His Glu Ala Cys Tyr Asp Gln Arg Glu Pro Gln Ala
65 70 75 80

Trp Cys Arg Pro Asn Glu Asn Gln Ser Trp Thr Asp Lys Gly Cys Phe
85 90 95

Cys Glu Asp Lys Leu His Ser Cys Val Ile Glu Arg Lys Asn Asn Gly
100 105 110

Lys Leu Glu Tyr Ser Tyr Cys Ala Pro Glu Ala Gly Trp Gln Cys Ala
115 120 125

<210> 42
<211> 387
<212> DNA
<213> Wuchereria bancrofti

<400> 42
atgaataaac ttttaatagc attcggttta gtaattcttc ttgtgacact tccgtgtgca 60
tcagaatcag acgaagagtt cgatgacggc tcaaatgatg agaccgacga caaagaggac 120
gaaggtaata gtgaaggagg tgatgaatat gtaaccaaag gagaagttgt tgaaactgat 180
ggcaagaaga aagagtgtct ttcgcacgaa gcttggttacg atcaacgtga accacaagcg 240
tggtgtagac cgaacgagaa tcagtcgtgg actgacaaaag gttgcttctg cgaagataag 300
ttgcattcgt gcgtcatcga aagaaagaac aacggtaaatt tggagtattc gtattgcgca 360
cctgaagcgg gttggcaatg cgcgtag 387

<210> 43
<211> 83
<212> PRT
<213> Loa loa

<400> 43

Met Ile His Asn Gly Gly Tyr Gln Lys Leu Lys Val Lys Leu Arg Lys
1 5 10 15

Lys Glu Cys Lys Ser His Glu Ala Cys Tyr Asp Gln Arg Glu Pro Gln
20 25 30

Asp Trp Cys Arg Leu Asn Glu Asn Gln Ser Trp Thr Asp Lys Gly Cys
35 40 45

Tyr Cys Asp Asp Lys Leu His Ser Cys Ile Ile Glu Arg Lys Asn Gly
 50 55 60

Gly Lys Leu Glu Tyr Ala His Cys Ala Pro Glu Gln Gly Trp Lys Cys
 65 70 75 80

Pro Ser Lys

<210> 44
 <211> 252
 <212> DNA
 <213> Loa loa

<400> 44
 atgattcata acggtggata ccaaaaatta aaagtcaa at tgaggaagaa aga atgcaag 60
 tctcatgaag cttgctacga tcaacgtgaa ccacaagact ggtgcagatt gaacgaaaat 120
 caatcgtgga cagacaaaagg ttgctactgt gacgataagt tgcattcatg cattattgag 180
 cgcaagaacg gtggcaagtt ggaatatgcg cactgtgcg ctgaacaagg atggaaatgt 240
 ccaagcaagt aa 252

<210> 45
 <211> 229
 <212> PRT
 <213> Brugia malayi

<400> 45

Met Val His Gly Cys Gly Asn Arg Thr Leu Lys Phe Leu Phe Phe Thr
 1 5 10 15

Ala Asn Leu Leu Thr Cys Ala Phe Gly Ala Leu Leu Phe Gly Ile Ser
 20 25 30

Leu Trp Ala Tyr His Asp Glu Asn Phe Leu Gln Lys Leu Glu Lys Val
 35 40 45

Gln Glu Ile His Lys Glu Tyr Ser Pro Glu Leu Thr Gln His Gln Ile
 50 55 60

Gly Leu Trp Leu Leu Ile Ile Ile Gly Ala Ser Ile Phe Leu Val Gly
 65 70 75 80

Phe Leu Gly Cys Cys Gly Ala Ile Cys Glu Ser Thr Lys Leu Leu Ala
 85 90 95

Leu Phe Ser Ile Ile Val Leu Ile Leu Ala Ile Leu Glu Val Ala Ser
100 105 110

Ile Val Leu Ile Ile Ala Gly Lys Asp Gln Phe Lys Asn Ala Leu Tyr
115 120 125

Asn Leu Leu Ser Lys Thr Gly Glu Ser Glu Asp Glu Met Gln His Phe
130 135 140

Lys Pro Ile Glu Asp Leu Phe Gln Cys Cys Gly Pro Thr Asn Glu Thr
145 150 155 160

Met Val Arg Tyr Ile Glu Asn Gly Leu Cys Glu Asp Glu Leu Arg Asn
165 170 175

Lys Pro Asn Cys Phe Ala Val Ile Ser Asp His Phe Asp Ser Ser Gln
180 185 190

Lys Asp Ile Ile Lys Ile Ser Val Val Leu Ile Ile Ile Asp Leu Leu
195 200 205

Ala Leu Phe Ser Thr Ser Met Leu Tyr Lys Ala Phe Arg Tyr Gln Thr
210 215 220

Pro Tyr Tyr Tyr Ala
225

<210> 46
<211> 690
<212> DNA
<213> Brugia malayi

<400> 46
atggttcacg gctgtggttaa tcgaacattg aaatttttat ttttcactgc aaatttatta 60
acttgtgcat ttggtgcact tctttttggc atttcattat gggcttatca tgatgaaaat 120
tttttgcaaa aattagaaaa agtacaggaa atacataaag aatattctcc tgaactaaca 180
caacatcaaa taggattgtg gttattaata attattggtg catccatatt tcttggttgg 240
tttctcgggtt gttgtggtgc gatatgtgaa agtaccaagc tattggcttt attttctatt 300
attgtattaa ttcttgcaat acttgaagtt gcttcgatag tacttataat tgctggcaag 360
gatcaattta aaaatgcttt atataattta ctatcaaaaa ctggcgaatc agaagatgaa 420

atgcaacatt ttaaacctat cgaagattta ttccaatggt gtggtccaac aaatgaaaca 480
atggttcgat acatcgagaa tggcttatgt gaggatgaat taagaaataa accgaattgt 540
ttcgcagtaa tatccgatca ttttgattca tctcaaaaag atatcattaa aatttccgtc 600
gttttaataa ttattgattt gcttgcatta ttttctacat ctatgcttta taaagcattt 660
cgctatcaaa caccatacta ttatgcttaa 690

<210> 47
<211> 230
<212> PRT
<213> Loa loa

<400> 47

Met Val His Gly Cys Gly Asn Arg Met Val Lys Phe Leu Phe Phe Thr
1 5 10 15

Ala Asn Leu Leu Ile Cys Leu Phe Gly Ala Leu Ile Phe Gly Phe Ser
20 25 30

Leu Trp Ala Asn Leu Asp Glu Asp Phe Ala Leu Lys Leu Glu Glu Thr
35 40 45

Arg Lys Ile His Lys Glu Asp Phe Asn Val Leu Ala Arg Tyr Gln Ala
50 55 60

Ala Phe Trp Val Leu Val Val Ile Gly Ala Phe Leu Phe Leu Val Gly
65 70 75 80

Phe Leu Gly Cys Cys Gly Ala Met Cys Glu Asn Ile Met Leu Leu Thr
85 90 95

Ala Phe Phe Ile Ile Ile Leu Ile Leu Thr Thr Ile Glu Val Gly Ala
100 105 110

Val Ile Phe Ala Ile Thr Ser Lys Gly Gln Phe Lys Ser Val Leu His
115 120 125

Arg Leu Leu Ser Glu Ala Gly Lys Ala Glu Asp Lys Tyr Leu Pro Asn
130 135 140

Leu Lys Pro Ile Glu Asp Leu Phe Tyr Cys Cys Gly Ala Thr Gln Glu
145 150 155 160

Thr Met Asn Arg Tyr Met Glu His Gly Leu Cys Glu Gly Glu Leu Lys
165 170 175

Asn Lys Pro Asp Cys Phe Thr Ala Ile Ser Asp Tyr Leu Glu Ser Thr
180 185 190

Gly Glu Ala Val Val Val Phe Ala Phe Phe Leu Leu Ile Ile Glu Leu
195 200 205

Phe Ala Leu Val Ser Thr Cys Ile Leu Cys Lys Ala Phe Arg Tyr Gly
210 215 220

Arg Pro Tyr Tyr Tyr Ala
225 230

<210> 48
<211> 693
<212> DNA
<213> Loa loa

<400> 48
atggttcacg gttgtggcaa tcgaatggtg aaatttttat ttttactgc aaatttactg 60
atctgtttat ttggcgcaact tatttttggc ttctcattat gggctaattt ggatgaagat 120
tttgcgctaa agctggaaga aacgagaaaa atacataaag aagatttttaa tgtgctggca 180
agatatcaag cagcattttg ggtattggtt gttattgggg cattcttggt tctcgttggt 240
ttcctcggct gttgtggtgc aatgtgtgaa aatatcatgt tgttgactgc atttttcatc 300
ataatactaa ttcttacaac aatcgaagtt ggcgcggtaa tatttgcaat cactagcaag 360
ggccaattta aaagtgtttt acataggcta ctatcagaag ctggtaaagc agaagacaaa 420
tacttgccga atttaaaacc catcgaagat ctgttttatt gctgtggtgc aacgcaagaa 480
acgatgaacc ggtacatgga acatggctta tgtgaaggag aattgaagaa taagccggac 540
tgcttcacgg caatatcgga ttatttgag tcaaccggag aagcggtcgt cgtatttgca 600
ttctttttgc taattatcga gttgtttgct ttagttttcca catgtatact atgtaaagca 660
ttccgttatg gaaggccata ctactatgct taa 693

<210> 49
<211> 113
<212> PRT
<213> Brugia malayi

<400> 49

Met Glu Glu Lys Val Val Glu Leu Thr His Asn Trp Ser Ala Glu Gln
1 5 10 15

Trp Asp Trp Pro Leu Gln His Asn Asp Glu Val Ile Lys Val Thr Asn
20 25 30

Thr Asn Asp Lys Phe Glu Val Gly Leu Asp Ala Ser Phe Phe Thr Pro
35 40 45

Lys Glu Ile Glu Val Lys Val Ala Gly Asp Asn Leu Val Ile His Cys
50 55 60

Arg His Glu Ser Arg Ala Glu His Tyr Gly Glu Ile Lys Arg Glu Ile
65 70 75 80

Ser Arg Thr Tyr Lys Leu Pro Ser Asp Val Asp Thr Lys Thr Leu Thr
85 90 95

Ser Asn Leu Thr Lys Arg Gly His Leu Val Ile Ala Ala Lys Lys Lys
100 105 110

Ala

<210> 50

<211> 342

<212> DNA

<213> Brugia malayi

<400> 50

atggaagaaa aggtagtgga actaacgcac aactggagtg cggagcagtg ggattggccc 60

ttacagcaca acgatgaggt gattaaagta accaacacga atgataagtt tgaagtcggt 120

ttggatgcat cattcttcac gccgaaggaa atcgaggtaa aagttgctgg cgataatctg 180

gtcattcact gcagacatga atcacgtgcc gagcattatg gagaaattaa acgtgaaatt 240

agtcgtacct ataagcttcc gtcggatgta gatacgaaga ctctgacatc aaatttgacc 300

aagcgaggac atttgggtcat cgctgccaaa aagaaagcat ga 342

<210> 51

<211> 165

<212> PRT

<213> Onchocerca volvulus

<400> 51

Gln Thr Ser Pro Met Glu Arg Phe Ile Val Asn Leu Leu Asp Ser Thr
 1 5 10 15

Phe Asp Asp Arg Ser Ser Arg Pro Leu His Ser Val Ala Pro Tyr Trp
 20 25 30

Leu His Gln Pro Glu Leu Asn Glu Cys Asn Ile Gly Asn Ser Leu Gly
 35 40 45

Glu Val Ile Asn Glu Lys Asp Lys Phe Ala Val Arg Ala Asp Val Ser
 50 55 60

His Phe His Pro Lys Glu Leu Ser Val Ser Val Arg Asp Arg Glu Leu
 65 70 75 80

Val Ile Glu Gly His His Glu Glu Arg Thr Asp Pro Ala Gly His Gly
 85 90 95

Ser Ile Glu Arg His Phe Ile Arg Lys Tyr Val Leu Pro Glu Glu Val
 100 105 110

Gln Pro Asp Thr Ile Glu Ser His Leu Ser Asp Lys Gly Val Leu Thr
 115 120 125

Ile Ser Ala Asn Lys Thr Ala Ile Gly Thr Thr Ala Ser Arg Asn Ile
 130 135 140

Pro Ile Arg Ala Ser Pro Lys Glu Pro Glu Ala Asn Gln Lys Ser Ala
 145 150 155 160

Ile Asn Asp Ala Lys
 165

<210> 52

<211> 574

<212> DNA

<213> Onchocerca volvulus

<400> 52

caaacttcac cgatggaacg ttcatagtg aaccttcttg acagtacatt cgatgacaga 60

tcatctcgac cgctccattc tggtgcacca tattggcttc atcaaccgga actgaatgaa 120

tgtaatatcg gaaattctct cggcgaggta ataaatgaga aagacaagtt tgcagttcga 180

gctgatgttt ctcatattcca tccgaaggaa ctttcggtgt cggttcgaga tcgtgaacta 240

gttattgaag gtcaccatga agagcgtacc gatccggcag gacatggtag tattgaacgt 300
cacttcattc gaaaatatgt cttgccagaa gaagtgcagc ctgacacgat cgaatcacat 360
ttgtccgata aaggagtgtt gacaattagc gcaaacaaaa cagctattgg cacgactgca 420
tcacgaaaca ttccaattcg agcatctcca aaagaaccgg aagcaaatca gaaatcggca 480
ataaatgatg caaagtaaaa agaagtagaa attccggata tatttcattc tttattttat 540
acgctttttt tttctttttt tggtcatttt aaag 574

<210> 53
<211> 113
<212> PRT
<213> Loa loa

<400> 53

Met Glu Glu Lys Val Leu Glu Leu Thr His Asn Trp Ser Ala Glu Gln
1 5 10 15

Trp Asp Trp Pro Leu Gln His Asn Asp Asp Val Ile Lys Val Thr Asn
20 25 30

Thr Asn Asp Lys Phe Glu Val Ser Leu Asp Ala Ser Phe Phe Thr Pro
35 40 45

Lys Glu Ile Glu Val Lys Val Ala Gly Asp Asn Leu Val Ile His Cys
50 55 60

Arg His Glu Ser Arg Ala Asp Gln Tyr Gly Glu Ile Lys Arg Glu Ile
65 70 75 80

Ser Arg Thr Tyr Lys Leu Pro Ser Asp Ile Asp Thr Lys Thr Leu Thr
85 90 95

Ser Thr Leu Thr Lys Arg Gly His Leu Val Ile Val Ala Lys Lys Lys
100 105 110

Ala

<210> 54
<211> 342
<212> DNA
<213> Loa loa

<400> 54

atggaagaaa aggtattgga actaacgcat aattggagtg ccgagcagtg ggattggccc 60
 ttgcagcata acgatgacgt gattaaagtg accaatacga atgataagtt tgaagtcagt 120
 ctggatgctt cattcttcac accgaaggaa atcgaggtga aagttgctgg tgataatctg 180
 gtcattcact gcagacatga atcacgtgcc gaccaatacg gtgaaattaa acgtgaaatt 240
 agtcgtacct ataagcttcc gtcggatatt gatacgaaga ccctgacatc aactttgacc 300
 aaaagaggac atctggtcat cgttgccaaa aagaaggcat ga 342

<210> 55
 <211> 220
 <212> PRT
 <213> Brugia malayi

<400> 55

Met Leu Phe Phe Val Ile Phe Ser Ile Thr Ile Ala Val Val Ala Gly
 1 5 10 15

Phe Glu Cys Pro Gly Gly Arg Leu Thr Pro Gln Gln Arg Lys Asp Ile
 20 25 30

Val Arg Gln Asn Asn Lys Phe Arg Ser Leu Leu Ile His Gly Lys Leu
 35 40 45

Lys Asn Arg Asn Gly Thr Tyr Met Pro Arg Gly Lys Asn Met Leu Leu
 50 55 60

Leu Lys Trp Ser Cys Gln Leu Glu Asn Ser Ala Gln Arg Trp Ala Asn
 65 70 75 80

Gln Cys Val Phe Gly His Ser Pro Arg Asn Gln Arg Gln Gly Ile Gly
 85 90 95

Glu Asn Val Tyr Ala Tyr Trp Ser Ser Glu Ser Val Glu Lys Leu Arg
 100 105 110

Asn Thr Ala Gly Thr Glu Ala Gly Lys Ser Trp Trp Ser Glu Leu Pro
 115 120 125

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

Arg Gln Gly Val Leu His Phe Thr Gln Met Ala Trp Gly Lys Thr His
 145 150 155 160

Lys Ile Gly Cys Gly Ile Ala Thr Asn Cys Asp Gly Gly Arg Thr Leu
165 170 175

Ile Ala Ile Cys His Tyr Ser Pro Ala Gly Asn Met Leu Lys Glu Leu
180 185 190

Ile Tyr Glu Leu Gly Glu Pro Cys Lys Thr Asp Ser Asp Cys Asn Thr
195 200 205

Lys Lys Cys Ala Lys Lys Ser Gly Leu Cys Arg Lys
210 215 220

<210> 56
<211> 897
<212> DNA
<213> Brugia malayi

<400> 56
gcacgagata ttttcaaagc taacagtata cattccacca aaaaactcgg caaaatgtta 60
tttttcgtta tattttccat cacgattgct gttgtggcag gttttgaatg tccaggaggt 120
cgactaacac cacagcaacg taaagatatc gttcgtcaga acaataaatt tcgttcatta 180
ctaattcatg gaaaacttaa aaataggaat ggtacatata tgccacgcgg caagaatatg 240
ttgctactga agtggagttg tcagttagaa aattctgcgc aaagatgggc aaatcaatgc 300
gtctttgggc actctccgag aaatcaaaga caaggaatcg gtgaaaatgt ctatgcctac 360
tggatcatcag aaagcgtcga aaagcttaga aataccgctg gtacggaagc cggcaaaagt 420
tgggtggtcag aacttccgaa actgtacaaa cagaatcctt cgaacaatct gactgatgat 480
gttgccagac aaggtgtttt acatttcaca cagatggcct ggggtaaaac gcataaaatt 540
ggttggtgta tagcaacaaa ctgcgatggt ggtcgcacac tcatagctat ttgccattat 600
tcacccgctg gaaatatgct aaaagaactg atatatgagc ttggcgaacc atgcaaaacg 660
gatagcgatt gtaacacaaa gaaatgtgcc aaaaaatctg gattgtgtag aaaatgaaag 720
agagtttaaa gtttcacttt ttgcactctt aattttggtt ttatattata aaactgagaa 780
ttattacaaa catatttatt ggctattata agataaaaaa gttccttgaa attcttctca 840
aataaaatth ctctctgata aaagcatgaa acaaaaaaaaa aaaaaaaaaa aaaaaaa 897

<210> 57
<211> 220
<212> PRT

<213> Wuchereria bancrofti

<400> 57

Met Leu Leu Phe Val Ile Phe Ser Ala Thr Ile Val Ala Val Ala Ala
1 5 10 15

Phe Glu Cys Pro Gly Gly Gln Leu Thr Pro Gln Gln Arg Lys Asp Ile
20 25 30

Val Arg Gln Asn Asn Lys Phe Arg Ser Leu Leu Ile Arg Gly Lys Leu
35 40 45

Lys Asn Arg Asn Gly Thr Tyr Met Pro Arg Gly Lys Asn Met Leu Gln
50 55 60

Leu Thr Trp Ser Cys Gln Leu Glu Asn Ser Ala Gln Arg Trp Ala Asn
65 70 75 80

Gln Cys Val Phe Gly His Ser Pro Arg Asn Gln Arg Gln Gly Ile Gly
85 90 95

Glu Asn Val Tyr Ala Tyr Trp Ser Ser Ala Ser Val Glu Asn Leu Arg
100 105 110

Lys Thr Ala Gly Thr Glu Ala Gly Lys Ser Trp Trp Ser Glu Leu Pro
115 120 125

Glu Leu Tyr Lys His Asn Pro Ser Asn Asn Leu Thr Asp Asp Val Ser
130 135 140

Arg Gln Gly Val Leu His Phe Thr Gln Met Ala Trp Gly Lys Thr His
145 150 155 160

Lys Ile Gly Cys Gly Ile Ala Thr Asn Cys Asp Gly Gly Arg Thr Leu
165 170 175

Ile Thr Ile Cys His Tyr Ser Pro Ala Gly Asn Ile Leu Lys Asn Leu
180 185 190

Ile Tyr Glu Leu Gly Glu Pro Cys Lys Lys Asp Gly Asp Cys Asn Thr
195 200 205

Lys Lys Cys Ala Lys Lys Ser Gly Leu Cys Arg Lys
210 215 220

<210> 58
 <211> 873
 <212> DNA
 <213> Wuchereria bancrofti

<400> 58
 ggaattcggc acgagcgcaca tcttctgtta tcaaataatat tttcaaagct aacagtgtac 60
 attctgccag aaaatcccgc aaaatgttac ttttcgtcat attttctgca actattgttg 120
 ctgtggcggc ttttgaatgt ccaggaggtc aactaacacc gcaacaacgt aaagatatcg 180
 ttcgtcagaa caataaattt cgttcattac tgattcgtgg aaaacttaaa aataggaatg 240
 gtacatatat gccacgcggc aagaatatgt tgcaactgac atggagttgt cagttagaaa 300
 attctgcgca aagatgggca aatcagtgcg tctttggaca ctcaccgaga aatcaaagac 360
 aaggaatcgg tgaaaatggt tacgcttact ggtcgtcagc aagcgttgaa aatccttagaa 420
 aaaccgctgg tacggaagcc ggcaaaagtt ggtggtcaga acttccggaa ctgtacaaac 480
 acaatccttc gaacaatctg actgacgatg tttccaggca aggtgttttg catttcacac 540
 agatggccttg gggtaaaacg cataaaattg gttgtggtat tgctacaaac tgtgatgggtg 600
 gtcgcacact cataactatt tgccattatt cgcccgtgga aaatatactg aaaaatctga 660
 tatatgagct tggcgaaccg tgcaaaaagg atggcgattg taacacaaaag aaatgtgcga 720
 aaaaatctgg attgtgcaga aagtgaaga atttgaagag tttcaccttc tcatttctaa 780
 ttttggtttt gtatcataaa actgacaatt attacaaaca tatttattgg ctattatggg 840
 ataaagaagt ttcttgaaaa aaaaaaaaaa aaa 873

<210> 59
 <211> 220
 <212> PRT
 <213> Onchocerca volvulus

<400> 59

Met Ile Leu Phe Ile Ile Phe Pro Ala Ile Val Val Ala Val Thr Gly
 1 5 10 15

Tyr Asn Cys Pro Gly Gly Lys Leu Thr Ala Leu Glu Arg Lys Lys Ile
 20 25 30

Val Gly Gln Asn Asn Lys Tyr Arg Ser Asp Leu Ile Asn Gly Lys Leu
 35 40 45

Lys Asn Arg Asn Gly Thr Tyr Met Pro Arg Gly Lys Asn Met Leu Glu
50 55 60

Leu Thr Trp Asp Cys Lys Leu Glu Ser Ser Ala Gln Arg Trp Ala Asn
65 70 75 80

Gln Cys Ile Phe Gly His Ser Pro Arg Gln Gln Arg Glu Gly Val Gly
85 90 95

Glu Asn Val Tyr Ala Tyr Trp Ser Ser Val Ser Val Glu Gly Leu Lys
100 105 110

Lys Thr Ala Gly Thr Asp Ala Gly Lys Ser Trp Trp Ser Lys Leu Pro
115 120 125

Lys Leu Tyr Glu Asn Asn Pro Ser Asn Asn Met Thr Trp Lys Val Ala
130 135 140

Gly Gln Gly Val Leu His Phe Thr Gln Met Ala Trp Gly Lys Thr Tyr
145 150 155 160

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

Ile Val Ile Cys His Tyr Ser Pro Gly Gly Asn Met Val Gly Glu Val
180 185 190

Ile Tyr His Arg Gly Asn Pro Cys Lys Val Asp Lys Asp Cys Tyr Thr
195 200 205

Lys Lys Cys Leu Ser Lys Ser Gly Leu Cys Arg Lys
210 215 220

<210> 60

<211> 883

<212> DNA

<213> Onchocerca volvulus

<400> 60

gcattttcta aagtgcacatc ttctgttatt atcaaata tttctgagat taacagctta 60

tattctatcg gaaaattccg caaaatgata cttttcatca tcttcctgc aattgtcgtc 120

gcggtgacgg gttataattg tccaggaggt aaactaacag cactggaacg taaaaaatc 180

gttggtcaga ataataaata tcgttcggat ttgattaatg gaaagcttaa gaatagaaat 240

ggtacataca tgccaagagg caagaatatg ttggaactga catgggattg taaattggaa 300
 agttcggcac aaaggtgggc caatcagtgt atctttggac attcaccaag acaacaaaga 360
 gagggagttg gtgaaaatgt ttatgcgtac tggatcatcag tatcagttga aggtcttaaa 420
 aaaactgctg gtacggatgc tgggaaaagc tgggtgggtcaa agcttcctaaa attatatgaa 480
 aataaccctt cgaataatat gacttggaaa gttgccgggtc aaggtgtttt gcatttcaca 540
 caaatggcctt ggggtaagac ttataaaatt ggttgccgggtg ttgcaacaca atgtgatggg 600
 ggtagaacac ttattgttat ttgtcactat tctcctgggtg gaaatatggg tggagaggtg 660
 atataccacc gaggtaatcc gtgtaaagtc gacaaagatt gctatacgaa aaaatgttta 720
 tcaaaatctg gactgtgcag aaaatgaaaa tttttcgctt ttcttcattt aattctcggc 780
 tatatatctc ctatattaat ttttcagcaa aaaagctata aagaaatatt cataattaa 840
 taaatatagt aattattatg aaataaaaaa ttaagttctg ctc 883

<210> 61
 <211> 220
 <212> PRT
 <213> Loa loa

<400> 61

Met Leu Cys Ser Phe Met Phe Ala Ala Ile Ile Ile Ala Val Glu Gly
 1 5 10 15

Tyr Arg Cys Gln Gly Gly Arg Leu Thr Pro Glu Gln Arg Lys Ala Ile
 20 25 30

Val Ile Gln Asn Asn Lys Phe Arg Ser Gln Leu Ile Arg Gly Glu Leu
 35 40 45

Lys Asn Lys Ala Gly Glu Phe Met Pro Arg Gly Lys Asn Met Leu Arg
 50 55 60

Met Arg Trp Ser Cys Ser Leu Glu Tyr Ser Ala Gln Arg Trp Ala Asp
 65 70 75 80

Arg Cys Ile Phe Gly His Ser Pro Arg Asp Gln Arg Asn Asn Ile Gly
 85 90 95

Glu Asn Val Tyr Ala Tyr Trp Ser Ser Gly Ser Val Glu Gly His Arg
 100 105 110

Lys Thr Ala Gly Thr Asp Ala Gly Lys Asn Trp Trp Ser Glu Leu Pro
115 120 125

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

Ser Gln Gly Val Leu His Phe Thr Gln Met Ala Trp Gly Lys Thr Tyr
145 150 155 160

Lys Ile Gly Cys Gly Ile Ala Thr Asn Cys Asp Gly Gly Arg Thr Leu
165 170 175

Met Val Ile Cys His Tyr Ser Pro Ala Gly Asn Met Leu Lys Glu Leu
180 185 190

Ile Tyr Glu Leu Gly Glu Pro Cys Lys Lys Asn Asn Asp Cys Tyr Thr
195 200 205

Lys Lys Cys Ser Val Lys Ser Gly Leu Cys Asn Lys
210 215 220

<210> 62
<211> 663
<212> DNA
<213> Loa loa

<400> 62
atgttatgtt ccttcatgtt tgcagcaatt atcattgctg tggaagggtta tcgatgtcaa 60
ggagggtcgac taacaccgga gcaacgtaaa gcaatcggtta ttcaaaataa taaattccgt 120
tcgcaactga tccgtggcga gcttaagaac aaagctggtg aatttatgcc acgtggcaag 180
aatatgttga gaatgagatg gagttgttcg ctggaatatt ccgcgcagag atgggcagat 240
agatgtatct ttggacactc accaagagat caaagaaaca atatcggtga aaatgtctat 300
gcttactggt catcaggaag cgttgaaggt catagaaaaa ctgctggtac agatgctggt 360
aaaaattggt ggtcagaact tccggaacgg tacggatcta atccttcaaa taatttgact 420
gctcaagttt ccagccaagg tgttttgcat ttcacacaga tggcttgggg taaaacgtac 480
aaaattggct gtggtattgc tacaaactgc gatggtggca ggacactaat ggtcatttgc 540
cattattcgc cagctgggaa tatgttgaaa gagcttatat atgagcttgg cgaaccatgc 600
aagaagaaca atgattgtta taccaagaag tgttcagtca agtctggatt gtgcaacaag 660
tga 663

<210> 63
 <211> 89
 <212> PRT
 <213> *Wuchereria bancrofti*

<400> 63

Met Ile Leu Glu Val Ala Ser Ile Val Leu Ile Ile Ala Gly Lys Asp
 1 5 10 15

Gln Phe Lys Asn Ala Leu Tyr Asn Leu Leu Ser Lys Thr Gly Glu Ser
 20 25 30

Glu Asp Glu Met Gln His Phe Lys Pro Ile Glu Asp Leu Phe Gln Cys
 35 40 45

Cys Gly Pro Thr Asn Glu Thr Met Val Arg Tyr Ile Glu Asn Gly Leu
 50 55 60

Cys Glu Asp Glu Leu Arg Asn Lys Pro Asn Cys Phe Ala Val Ile Ser
 65 70 75 80

Asp His Phe Asp Ser Ser Gln Lys Asp
 85

<210> 64
 <211> 53
 <212> PRT
 <213> *Wuchereria bancrofti*

<400> 64

Val Ile His Cys Arg His Glu Ser Arg Ala Glu His Tyr Gly Glu Ile
 1 5 10 15

Lys Arg Glu Ile Ser Arg Thr Tyr Lys Leu Pro Ser Asp Val Asp Thr
 20 25 30

Lys Thr Leu Thr Ser Asn Leu Thr Lys Arg Gly His Leu Val Ile Ala
 35 40 45

Ala Lys Lys Lys Ala
 50

<210> 65
 <211> 267
 <212> DNA

<213> Wuchereria bancrofti

<400> 65

atgatcctgg aggtggcctc catcgtgctg atcatcgccg gcaaggacca gttcaagaac	60
gctctgtaca acctgctgtc taagacaggc gagagcgagg acgagatgca gcacttcaag	120
cctatcgagg acctgttcca gtgctgcggc cctaccaacg agaccatggt gaggtacatc	180
gagaacggac tgtgcgagga cgagctgagg aacaagccta actgtttcgc cgtgatctct	240
gaccacttcg attctagcca gaaggac	267

<210> 66

<211> 162

<212> DNA

<213> Wuchereria bancrofti

<400> 66

gtcattcact gcagacatga atcacgtgcc gagcattatg gagaaattaa acgtgaaatt	60
agtcgtacct ataagcttcc gtcggatgta gatacgaaga ctctgacatc aaatttgacc	120
aagcgaggac atttgggtcat cgctgcaaaa aagaaagcat ga	162

<210> 67

<211> 387

<212> DNA

<213> Brugia malayi

<400> 67

atgggtaaca agctcctcat cgctttcgga ctctgtgatcc tgtttgtcac cctgccttgc	60
gtcagtgaga gcgacgagga gtttcatgac tctgccgctg acgacaccga cgattccgag	120
gccggtggcg gctctgaggg gggcgacgag tacgtgacta agggggagtt tgtggagacc	180
gatggaaaga agaaagagtg ctccagccac gaggcctgtt atgaccagcg ggagcctcag	240
gcttggtgca ggctgtctga gaatcaggcc tggactgata gaggctgttt ctgtgaggac	300
aagctgcatt cttgcgtgat tgagcggact aataatggca agctggaata cagctactgc	360
gctcccaggc caggttggca gtgcgcc	387

<210> 68

<211> 153

<212> DNA

<213> Wuchereria bancrofti

<400> 68

atggtcattc actgcaggca cgagagcaga gccgagcact acggcgagat caaaagagag	60
atcagcagga catacaagct gccctcagac gtggacacta agactctgac tagcaatctg	120

accaagaggg gccacctggg catcgctgcc aag 153

<210> 69

<211> 267

<212> DNA

<213> Wuchereria bancrofti

<400> 69

atgacctgg aggtggcctc catcgctgctg atcatcgccg gcaaggacca gttcaagaac 60

gctctgtaca acctgctgtc taagacaggc gagagcgagg acgagatgca gcacttcaag 120

cctatcgagg acctgttcca gtgctgcggc cctaccaacg agaccatggg gaggtacatc 180

gagaacggac tgtgcgagga cgagctgagg aacaagccta actgtttcgc cgtgatctct 240

gaccacttcg attctagcca gaaggac 267