

SEQUENCE LISTING

<110> Columbia University in the City of New York

<120> Novel Tilapia Virus and Uses Thereof

<130> 01001/004493-W00

<140> Filed Herewith

<141> 2015-12-15

<150> US 62/091,824

<151> 2014-12-15

<160> 39

<170> PatentIn version 3.5

<210> 1

<211> 1326

<212> DNA

<213> Tilapia Lake RNA Virus

<400> 1

gaaatggact cgcggtttgc acagctaact ggggttttct gtgacgattt cacttatagc	60
gaaggagagcc gaaggttcct aagttcttac agtacagtag agagacgtcc aggagtcccc	120
gtagagggtg actgttatga ctgtttgaag aataagtgga ttgcctttga gctggaaggc	180
cagccgcgga aatttccaaa ggcaacagtt cgttgcattt tgaacaatga tgctacatac	240
gtttgctctg agcaagagta ccagcagatt tgtaaggtag aattcaagga ttatttggag	300
atcgacgggg ttgttaaagt tgggcacaag gcatcctacg atgctgagct aagggaacgg	360
ctattggaac taccacatcc aaagagtggc ccgaagcctc gtattgagtg ggtggcacca	420
cccagacttg cggacatatc caaggaaaca gctgagctaa agaggcaata tggattcttc	480
gagtgtctca agttcctcgc ctgcggtgag gagtgtggtc ttgaccaaga ggcaagagaa	540
cttatactga acgagtacgc acgtgataga gaatttgagt tccgcaatgg aggggtggata	600
caaagggtata cagttgcttc tcacaagcct gctacacaga agatattacc tctaccggt	660
agtgtctccac ttgctcgtga gcttttgatg ttgattgcta gaagcacaac tcaggcaggg	720
aaagtactgc atagcgataa taccagcata ctagctgtac cggtcatgcg cgactctgga	780

aagcacagta aaaggagacc aaccgcctcc actcaccact tagttgtagg tctaagtaaa	840
cctggctgtg aacacgattt tgagtttgac gggtagcagg cagctgtgca tgtgatgcac	900
ctagatccca agcaatcggc taatataggg gagcaagact ttgtgagtac ccgagaaatt	960
tacaagctgg atatgttgga actacctccc ataagtagga aggggtgatct ggacagagct	1020
agtggctctg agacaagatg ggacgtcatc ttacttctgg aatgcctcga ctctacaagg	1080
gtagccaag cagtggctca acattttaat aggcaccggc tagcacttag cgtctgtaag	1140
gacgagttca ggaaaggcta ccagctggct tctgagataa ggggtacaat acccttaagc	1200
tcactttatt attcactttg tgcagtaaga ttgcggatga cagtacaccc atttgcgaga	1260
tgatcgcttt cgacgccttc gctaaagggt acgacgttct aatagaggat tatgggaaaa	1320
atttgc	1326

<210> 2
 <211> 1471
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 2	
ccaaatttta ctctctatta ccaaatacat ttacttctga aaaatgagtc agtttgggaa	60
atcattcaag ggcagaactg aggtcacaaat aaccgaatat cgctctcata ctgtcaaaga	120
tgtgcacaga agcttactta cggctgacaa gtctctaagg aagtcattct gttttaggaa	180
cgccctaaac cagttcttgg ataaagattt gcctcttttg cccattcggc caaaattaga	240
gtccagggtt gctgtgaaaa agtctaagct gaggagtcag ctgtcgttca gacccggttt	300
gactcaggag gaagcaattg atctttacaa caagggtat gatggtgaca gcgtctcagg	360
tgccttgcaa gacagggtag tcaatgagcc tgtagcttac tcgagtgcag ataatgacaa	420
atttcacagg ggcttagcgg ctctagggtta cactttggct gatagagcat ttgatacatg	480
cgaatccggc ttcgtgagag caattcctac cactccatgc gggttcatat gttgtgggcc	540
aggttctttc aaagattcac ttggatttgt gataaaaaatc ggcgaattct ggcacatgta	600
tgacgggttc caacacttcg tcgctgtcga ggatgctaag ttcctagcaa gtaagtctcc	660
ttcgttttgg ttggcaaaac gtcttgcaaa gaggctgaat ctggtcccaa aagaggatcc	720

atctatagca gcagctgagt gcccttgtag gaaagtgtgg gaagctagtt ttgctagggc	780
acctactgca ctagatccat ttggaggcag ggcccttctgc gaccagggtt ggggtgtacca	840
cagggacgta ggggtatgcaa cagctaacca catatcacag gaaacacttt ttcaacaagc	900
gctttcagtg aggaaccttg gaccgcaagg tagtgcaaat gtctcaggct caatacatac	960
cgccctggac aggctcagag cagcgtacag tagggggacg cccgcctcta gatctatact	1020
gcaagggctt gcaaattctca tcacacctgt aggtgaaaac tttgaatgcg atctcgacaa	1080
gaggaagctc aatataaagg cattacgttc tcccagagagg tacattacga tagagggcct	1140
ggttgtaaac ctggacgatg tggttagagg gttctacctt gacaaggcga aggtcactgt	1200
tctctcgaga tcaaagtgga tgggttacga ggaccttcct cagaaacctc cgaacggtag	1260
attttactgt agaaagagga aggcaatgct tctcatctca tgtagtccag gcacgtacgc	1320
aaagaagcga aaagtggcag tgcaggagga tcgctttaaa gatatgaggg ttgagaattt	1380
ccgggaggta gcggaaaata tggatctaaa tcagtaggggt ttcttggcaa aagccttcac	1440
tatatatatg gtaataatga gaaagatttg c	1471

<210> 3
 <211> 1098
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 3	
ccaaatgttt ctcttagctc agactccaat agctatgcag gcgctgggtcc tgacaagctg	60
cctagtttgc gcactagcaa gtgatgaaag ttttaaggata aaacgactac aatcatacct	120
aaacaatacc taccaaagta gggagataga aagtgaaata aggcgtggat ttgcatccaa	180
gttcaggatg gagagttgct cctgcactat ggggggtgcac tacattgtaa ccccatcctc	240
gggtgggtcg ttctgcactg ggttacatgc agtacctaac agcttcccag ccctcgggta	300
caaacttccc aaagcagggg gaagagggtga ttggaaagct actgaagtta ggattgacga	360
agatagtggg gttgttctat acaacgtttc caggtgcagc cacagtagcg agtgcagaga	420
tttggagggtg tattccaccg tactgccagg tcagtgtgac tgtaccagac ccactgtgga	480

cgactacaag accatgctgg cctcaaggca gccgaagtcg tttgtagtag caggcctcat	540
tatactgtgt ttacttgcta gctcagtagc aattggcatg ggtgtttaca attatgctgg	600
ggtcatcggc ctagcggacg cagctcaagc agatgtttct gagatttggg agtacttaga	660
agctttgaca cgggaagtca ccggtatgac gctaggagag ttttgctcga ttaaatccct	720
cgtctgtaaa tctgataaca taggcaaatt caaagagcaa tttgcagcct ttggggaagc	780
tattcttgca atagtgtttg ggatgctaga gaaatataag tttgtctatt acctgggtgct	840
ttcgctgatg gttctctcgc tactcagtaa acttgtttct ctgttgaagc aggtgccctt	900
ctatgggagt atcaaagttt tagtattccg gaggctaaga gttgtgtgtt tcaagacctt	960
tttctatatt aagaagcggc ttaagaagaa aagcccgctt gaggatgacg aagtcctct	1020
gcttccatta tcttgatcct taagcttcta ttcctggtag gtcataaagt ggtaaaactga	1080
gaaaagagta aaatttgc	1098

<210> 4
 <211> 1044
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 4	
ccaaatttta cctctcgcac gcatttttat ctacaggatt gtccaatgag ttggcttagg	60
gtgataagaa cccttacttt gttttcaaca ctctttaacg gaagcgatca atgcgtggac	120
aacatgtggc ggttttacgg gagatcaaac tacacgtcaa gcgtagtcat tgacggggac	180
aaatattctg ttgaagggtc atattcgagt agtgattatc tggatccagc agtacagaag	240
gtggttctgg gacttgatgg tagcaacgaa gtcatagact cagggtgggtc tccatactac	300
atgtatgatt tggagggatc aaaaggggaa ctccatcatc tgaactgcaa ctttgtcgag	360
aaacgatgta atccgacgct aaactttatg cttggaggat ttgttttgtg cccaggaata	420
tcgagaaaaa aactggagcc tgtaaccgac aagatatgg agagccgggg aataccgggc	480
cgaggtaaaa tacgtactat aaaaataagc tctaaactgt ttgagacatc gctgtgcctt	540
tcgaagagga ggcccatctt tagcacctgt atgctaattgt cgcgtggtct ttgtacaaac	600
tgtaagcgta ctatagatag aacatatatg acgccaacg gcttcagaac tgaatacaag	660

tggagctgca gagacaatag cacaaaacag tgttgggtat tagttgagtc actggaggag	720
aatcactccc catacaaatg ccacttttcc gcagtgggaag tcctactacc agccgaaata	780
aagcgtcacc agctcatcag cgagtgggtcc gcgatgcagg atgaagttgc ttataagaag	840
tcaaattgctt atcttcttgc tcgtactttt cttagctata caaaaatgcg tagattaaat	900
cctgtaattg atcttttcgat atcaccacca gtgacagtaa gatcctgctg taaaattaat	960
aaatacatgt gacactatat gtcctatcat gtgggcgaaa tgcccaggta cagttttaag	1020
tgcttgattg agagaaatat ttgc	1044

<210> 5
 <211> 777
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 5	
ccaaatttta ctctctttgc attgcatacc gtatagtaat agacacaatg tcctacaaga	60
ttggtgagct tgagagaatt atcacgcgca aaaacaccct cccaaggac agcggaagtc	120
agactgggct gttccatcga ctgctcctag agcattactc tggcgcctcg aacgtatggt	180
tcttttgtgc aactgggttt acaccaata caaatggcac aacctggatt gtattgacga	240
gtcacccaac cgatgggtga gaaaaggtag ctttgaaatg gaagtatgaa gtgagccccg	300
gattgccagt cagaagggtta cttgcccagg aggggtacagc agtaaggaggc ccgaaaggag	360
cctatttagt caaaggggac atgcatctct gttcaactac cttctacact agaagggaag	420
cgaagtactg gctctgtgcg ccatcccaa agtttccaca ttggaccaag agatcagcgt	480
tggtgaccag cactcgacca ctgactgagt tgagcagggt tgccacatac ctagaggcta	540
taagtaaggg tgcaactgat gtcaatgaat cgtgggtgttc ctaccacaga gttgggttag	600
tgccaatccc taaaggaatc acgtttgaac tctaattacc cagctgtttc gttgtcttat	660
tggggaggcc tttctaagtt aactaattac ttttgaaagc agggataatt ggtctgagag	720
cttcttatgg tactcagtag cgttcactaa ggatggtagc atgagagaaa gatttgc	777

<210> 6

<211> 1249
<212> DNA
<213> Tilapia Lake RNA Virus

<400> 6
ccaaagttta ctcctattac ccagaatagc taacttaata aactgaaaat ggtgagaact 60
acaaagacta gtatggcagc tgccagcact gttgcaccag aggttagcaat ggatgaaagt 120
tcaccagca cttcgcaggt acaagctgaa ctccaagaa accttgaggt tttcaacgaa 180
gcttgtggtc atgtgtttgg aagttccttt aacagggagg acaacagtgt gatattctgat 240
gctgctgcat ttctctttta aatgcacact cactccctcg atggtcagga ggctaagggtt 300
ctgagagcca gtgaaaagaa gagagagagg gagaacgcta agaaatcaag gaaggcacca 360
gaagcagggga tgagggtcgg aaggagcctt atattaacca gcagatggac tgaatactgc 420
gcaacctgtg tgcctgcact gggctcaaag atgaagggtga taaaagcctc aggggacgca 480
gctatgattc agatgatgaa ggaccataac tctctattaa gagtgtgtgt tcgcattgag 540
gtctggaagg ctaggtacgt cagtttggtt gctctcgacg agaggattca gactttggag 600
gacgccaat ggttcccata tctgagtggg gattcctatc gtgcttgccc agggctgggtt 660
ggtggctact ttgcaaagaa agcagcagca ggagaaagag gaaagaacta caaaaagttg 720
aatcagactg ctataatccc gcctccgaga tttctgatca ttggccacag gctgcagata 780
ggcgaccagg tcaccctcag ggagctgctt gcctcaattg cttggggcct ttgcgacggt 840
gtccttgctg agtgttggag cccctcgag ggggacggga gtattgggtgt tgttgttggt 900
ctacctctgc aagctacagg aagctgcttc ctggtggtag ctagccacgg gctctcagca 960
attgccgact ctaggattga gggaacaggg aacacgaatc tgctggaaga atgcattgcc 1020
attcagaaac aggacggtgt cataaaatgt aagagaagtg ggaagagtct gtatcactgc 1080
ctcaaggaga cagcaggggc tgttgggaga taggcaacga agtaggccac ccatgcgcgg 1140
aaagctgcac aggctgcaa gggcccctct tagcccaagt tttctatata ttctttaaca 1200
agtcattctaa aactggtaaa ttcttagacg gtaattggag aaagatttg 1249

<210> 7
<211> 1640

<212> DNA

<213> Tilapia Lake RNA Virus

<400> 7

ccaaacgtta tctcttaatt acgcactatt actgtactac cataaggtat gtgggcattt	60
caagaaggag ttgcaaagg taacctgtta tcaggccccga cctcaatgaa ggcaccggat	120
tcagcagcga gggagtcatt agacagagcg tctgaaatca tgacaggaaa atcgtacaat	180
gctgtccaca ctggggactt aagcaagctg cctaatacagg gagaaagtcc actgaggata	240
gtcgattccg acctttattc agaaaggagt tgctgttggg ttatagagaa ggagggcaga	300
gttgatgca aaagtaccac gctcaccgc ggtatgacgg gcctgttgaa cacaacaagg	360
tgtagttctc catctgagct catatgtaag gttttgacag tagaatccct atctgaaaag	420
ataggtgaca cgagcgtcga ggagttactt tctcatggca ggtactttaa gtgcgcactt	480
cgcgaccagg agaggggtaa acccaagagc agagctatct ttctgtcaca tccattcttc	540
agattgcttt cctctgtagt agagacgcac gctagatctg tgctgtcaaa ggtctcagca	600
gtgtacaccg ctactgctag tgcagaacaa cgggctatga tggccgcaca ggttgtagag	660
tcaagaaaac atgttcttaa tggcgactgt actaagtata atgaggcaat cgacgcagac	720
acactgctaa aagtgtggga tgcaataggc atgggggtcaa tcggagtcatt gctcgcttac	780
atgggtgcga ggaaatgcgt tctcattaaa gacactctag tagagtgtcc aggaggtatg	840
ttgatgggaa tgtttaacgc aactgccacc ttggcattgc aggggacgac tgacagattc	900
ctgtctttca gcgacgactt tataacatcg tttaactcgc ctgctgaatt acgcgagata	960
gaggacctgc ttttcgcaag ctgtcataac ttgtcgctaa agaagagtta catttcagtt	1020
gcctcactgg aaataaactc gtgtaccctc actagggacg gtgacctagc cacagggttg	1080
ggttgtagct ctgggtgtccc tttcagggga ccacttgtga ctctgaaaca gactgcagct	1140
atgttatctg gcgctgttga ctcaggagtt atgccattcc actcagcaga acgtctgttc	1200
cagataaagc agcaggaatg tgcctatagg tataacaacc ccacttacac aacgaggaat	1260
gaggacttcc tccccacatg cctggggagg aagactgtaa ttagctttca atctctactg	1320
acttgggatt gccaccatt ttggtaccag gtgcaccccg atggcccaga cactatagat	1380

cagaaagtcc tgtctgtcct tgcttcaaag actcgcagaa ggagaacccg actggaggct	1440
ctctcagact tggacccccct ggtccctcat aggctcctcg tatcagagtc agacgttagc	1500
aagatcagag cagctaggca ggctcacttg aagtccttag gcttggaaca acccacaac	1560
tttaactatg ctatttataa agcagtcag cccaccgctg ggtgctaagt aactatatag	1620
gcgaatgaga gaaatatattg	1640

<210> 8
 <211> 465
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 8	
ccaaatttta accctactaa caccaaatat agctataagc caggatgagt gtggcagatt	60
atttgtcaag tgacagtgcac tcgggggctg agagctcagg atgttttagta ctaagaagtc	120
ggaagatcaa gaagggcaag aaagctgctt caaagaagcg aagttggaag aatgaaaggt	180
atggtgctga cgagagcggg gaagataata tagagtgggg tgacgaagtc gacctcgaga	240
tggacgactg tgattctgca atcccagagt gggctagggt tgatttcaat cccaaaaaca	300
gaagggacag agaggatgat gggcagagtg acctatctcg attttccgaa gatttcggaa	360
agaagtctct tgacgtgcag tcttagcacc ttaatatcgg ttctgatttc gttcgtatcc	420
acaggccaac gctaactata cagggtgtca gagggaaaga tttgc	465

<210> 9
 <211> 1371
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 9	
ccaaatatta ccccttaatc cttaatagac cgttaacttt cttttgaaat ggactcgcgg	60
tttgcacagc taactgggggt tttctgtgac gatttcactt atagcgaagg gagccgaagg	120
ttcctaagtt cttacagtac agtagagaga cgtccaggag tccccgtaga gggtgactgt	180
tatgactgtt tgaagaataa gtggattgcc tttgagctgg aaggccagcc gcggaaattt	240
ccaaaggcaa cagttcgttg cattttgaac aatgatgcta catacgtttg ctctgagcaa	300

gagtaccagc agatttgtaa ggtacaattc aaggattatt tggagatcga cggggttggt	360
aaagttgggc acaaggcatc ctacgatgct gagctaaggg aacggctatt ggaactacca	420
catccaaaga gtggcccgaa gcctcgtatt gagtgggtgg caccaccag acttgcggac	480
atatccaagg aaacagctga gctaaagagg caatatggat tcttcgagtg ctcaaagttc	540
ctgcctgcg gtgaggagtg tggcttgac caagaggcaa gagaacttat actgaacgag	600
tacgcacgtg atagagaatt tgagttccgc aatggagggt ggatacaaag gtatacagtt	660
gcttctcaca agcctgctac acagaagata ttacctctac cggctagtgc tccacttgct	720
cgtgagcttt tgatgttgat tgctagaagc acaactcagg cagggaagt actgcatagc	780
gataatacca gcatactagc tgtaccggtc atgcgcgact ctggaaagca cagtaaaagg	840
agaccaaccg cctccactca ccacttagtt gtaggtctaa gtaaacctgg ctgtgaacac	900
gattttgagt ttgacgggta cagggcagct gtgcatgtga tgcacctaga tccaagcaa	960
tcggctaata taggggagca agactttgtg agtaccgag aaatttaca gctggatatg	1020
ttggaactac ctcccataag taggaagggt gatctggaca gagctagtgg tcttgagaca	1080
agatgggacg tcatcttact tctggaatgc ctcgactcta caagggttag ccaagcagt	1140
gctcaacatt ttaataggca ccggctagca cttagcgtct gtaaggacga gttcaggaaa	1200
ggctaccagc tggcttctga gataaggggt acaataccct taagctcact ttattattca	1260
ctttgtgcag taagattgcg gatgacagta caccatttg cgagatgatc gctttcgacg	1320
ccttcgctaa aggttacgac gttctaatag aggattatgg gaaaaatttg c	1371

<210> 10
 <211> 548
 <212> DNA
 <213> Tilapia Lake RNA Virus

<400> 10	
ccaaatttta ctcacaagtc cgattacttt ttccgcttgg tgatgtcacg atggatagaa	60
aatacagatt ctgtgtcagt aatcttgaca gagatgagtc ggtcgtacgt cactttgtgc	120
cattaccccc cttggagctt gtgctgcggc ggcaagacat cacaacctgg tcaagtctgg	180
atcctggatc gaaaacattg tctagaatgt tcagagatct cagagttaat gacactgagt	240

cagccaactt ggcaggagag tgcaatgggtg ataggagct gggccaagt agtaacggag	300
cacggaattt tgcacacttc aacatcggaaggcaggcac caagaagggt catgtggagg	360
atatctgaca tggctggcga tagaacttta tgagggcggt ccaggggcaa ttgaagctcc	420
gcgaacctac tgattcctca gctagaacat tgtagtgaac catgtgacat taataattta	480
gctttagtaa aaatggataa gcttcagctc tggcaaagta tgactttaag gacgtgagaa	540
agatttgc	548

<210> 11
 <211> 657
 <212> DNA
 <213> Tilapia Lake RNA Virus

<220>
 <221> misc_feature
 <222> (1)..(1)
 <223> n is a, c, g, or t

<400> 11	
ncaaatatta cctcatctac actaacattt ccaattggac agcatatcca ggaataagta	60
tggctcaaat cccaacacta agagagggcc aagggaagct ctacgatttc acgctcaacg	120
gcatgacagt gactagagac acagtcaaca ctgtagttgc tctggagttt cttgtcaatg	180
cagggtccgga tttgctttcc ctaacaattg gcgaaggcct ctcagaagaa acaaagtta	240
aacacctgct tgtaagcac gccggcatga cccgaaagcg gatagaggaa aggctgggac	300
gaatctcgag gcgagtcagt gtgacagtcg acgcaattat aataacaaac cgcaagggtc	360
aaagatttga attcaatcgg aagcagtacc tggatattgc caaacaagct atgaagctta	420
agctccctgg gattaactgt gtcgacatac ccactgcgct cgcttttctc gaggaggtcc	480
tggcaactgc tttgaaggac actgaagggt cacaagatga caggatggcc cttgaaggcag	540
acacttctgc tgctatcaat catttccgtg aaatgcttaa ataaaaagtg agtcttcagt	600
gtcattttcc ccaggagggt aagctactcc atttgtgtaa tgatgagaaa aatttgc	657

<210> 12

<211> 420
<212> PRT
<213> Tilapia Lake RNA Virus

<400> 12

Glu Met Asp Ser Arg Phe Ala Gln Leu Thr Gly Val Phe Cys Asp Asp
1 5 10 15

Phe Thr Tyr Ser Glu Gly Ser Arg Arg Phe Leu Ser Ser Tyr Ser Thr
20 25 30

Val Glu Arg Arg Pro Gly Val Pro Val Glu Gly Asp Cys Tyr Asp Cys
35 40 45

Leu Lys Asn Lys Trp Ile Ala Phe Glu Leu Glu Gly Gln Pro Arg Lys
50 55 60

Phe Pro Lys Ala Thr Val Arg Cys Ile Leu Asn Asn Asp Ala Thr Tyr
65 70 75 80

Val Cys Ser Glu Gln Glu Tyr Gln Gln Ile Cys Lys Val Gln Phe Lys
85 90 95

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

Tyr Asp Ala Glu Leu Arg Glu Arg Leu Leu Glu Leu Pro His Pro Lys
115 120 125

Ser Gly Pro Lys Pro Arg Ile Glu Trp Val Ala Pro Pro Arg Leu Ala
130 135 140

Asp Ile Ser Lys Glu Thr Ala Glu Leu Lys Arg Gln Tyr Gly Phe Phe
145 150 155 160

Glu Cys Ser Lys Phe Leu Ala Cys Gly Glu Glu Cys Gly Leu Asp Gln
165 170 175

Glu Ala Arg Glu Leu Ile Leu Asn Glu Tyr Ala Arg Asp Arg Glu Phe
180 185 190

Glu Phe Arg Asn Gly Gly Trp Ile Gln Arg Tyr Thr Val Ala Ser His
195 200 205

Lys Pro Ala Thr Gln Lys Ile Leu Pro Leu Pro Ala Ser Ala Pro Leu
210 215 220

Ala Arg Glu Leu Leu Met Leu Ile Ala Arg Ser Thr Thr Gln Ala Gly
225 230 235 240

Lys Val Leu His Ser Asp Asn Thr Ser Ile Leu Ala Val Pro Val Met
245 250 255

Arg Asp Ser Gly Lys His Ser Lys Arg Arg Pro Thr Ala Ser Thr His
260 265 270

His Leu Val Val Gly Leu Ser Lys Pro Gly Cys Glu His Asp Phe Glu
275 280 285

Phe Asp Gly Tyr Arg Ala Ala Val His Val Met His Leu Asp Pro Lys
290 295 300

Gln Ser Ala Asn Ile Gly Glu Gln Asp Phe Val Ser Thr Arg Glu Ile
305 310 315 320

Tyr Lys Leu Asp Met Leu Glu Leu Pro Pro Ile Ser Arg Lys Gly Asp
325 330 335

Leu Asp Arg Ala Ser Gly Leu Glu Thr Arg Trp Asp Val Ile Leu Leu
340 345 350

Leu Glu Cys Leu Asp Ser Thr Arg Val Ser Gln Ala Val Ala Gln His
355 360 365

Phe Asn Arg His Arg Leu Ala Leu Ser Val Cys Lys Asp Glu Phe Arg
370 375 380

Lys Gly Tyr Gln Leu Ala Ser Glu Ile Arg Gly Thr Ile Pro Leu Ser
385 390 395 400

Ser Leu Tyr Tyr Ser Leu Cys Ala Val Arg Leu Arg Met Thr Val His
405 410 415

Pro Phe Ala Arg
420

<210> 13
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primre

<220>
<221> misc_feature
<222> (19)..(24)
<223> n is a, c, g, or t

<400> 13
ggaactcaat gcacgcgtnn nnnn 24

<210> 14
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 14
ggaactcaat gcacgcgt 18

<210> 15
<211> 54
<212> DNA
<213> Artificial Sequence

<220>

<223> synthetic primer

<220>

<221> misc_feature

<222> (54)..(54)

<223> n is a, c, g, or t

<400> 15

ccagtgagca gaggacgag gactcgagct caagcttttt tttttttttt ttvn 54

<210> 16

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 16

tatcacgtgc gtactcggtc agt 23

<210> 17

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 17

ccagtgagca gaggacg 18

<210> 18

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 18

gaggactcga gctcaagc 18

<210> 19

<211> 19

<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 19
aagttctctt gcctcttgg 19

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

<220>
<223> synthetic primer

<400> 20
cacccagact tgcggacata 20

<210> 21
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 21
tccaaggaaa cagctgagc 19

<210> 22
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 22
gaggcaatat ggattcttcg 20

<210> 23
<211> 20
<212> DNA
<213> Artificial Sequence

<220>		
<223>	synthetic primer	
<400>	23	
	gttgggcaca aggcataccta	20
<210>	24	
<211>	20	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	synthetic primer	
<400>	24	
	tatgcagtagc tttccctgcc	20
<210>	25	
<211>	20	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	synthetic primer	
<400>	25	
	ttgctctgag caagagtacc	20
<210>	26	
<211>	18	
<212>	DNA	
<213>	Artificial Sequence	
<220>		
<223>	synthetic primer	
<400>	26	
	cagatcactg atcgatgc	18
<210>	27	
<211>	18	
<212>	DNA	
<213>	Artificial Sequence	
<220>		

<223> synthetic primer

<400> 27

gtctgaaagg taaggtgg

18

<210> 28

<211> 23

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 28

agttgcttct cayaagcctg cta

23

<210> 29

<211> 24

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 29

tcgtgttcac arccaggttt actt

24

<210> 30

<211> 21

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 30

ggtcaattcg agtcatgctc g

21

<210> 31

<211> 26

<212> DNA

<213> Artificial Sequence

<220>

<223> synthetic primer

<400> 31
gctggactgc ttataaata gcatag 26

<210> 32
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 32
atcctgcgtc tggacctggc t 21

<210> 33
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 33
tgccaatggt gatgacctgt c 21

<210> 34
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 34
agctatgtta tctggcgct 19

<210> 35
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 35
gttggtatatac ctataggcac at 22

<210> 36
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic probe

<400> 36
gccattccac tcagcagaac gtctg

25

<210> 37
<211> 22
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 37
gcgtgacatc aargagaagc tg

22

<210> 38
<211> 19
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic primer

<400> 38
ccaatggtga tgacctgtc

19

<210> 39
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> synthetic probe

<400> 39
ccctggagaa gagttacgag ctgc

24